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Scott Paper Co. Buys Anacortes Pulp Mill

Contract To Purchase Anacortes Pulp Mill At Anacortes, Wash., With Annual Capacity of 30,000 Tons of Unbleached Sulphite Pulp Announced By Scott Paper Co.—Educational Plan Aids Employees.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., September 16, 1940—In connection with the long range raw materials program of the Scott Paper Company, announcement is made of the consummation on September 4, 1940, of a contract to purchase on November 15, 1940, the Anacortes Pulp Mill located at Anacortes, Wash. This is the second pulp mill which the company has acquired this year, having purchased the entire outstanding capital stock of the Coos Bay Pulp Corporation in June.

Formerly a unit of the Puget Sound Pulp and Timber Company, the newly acquired Anacortes Pulp Mill has a rated annual capacity of approximately 30,000 tons of unbleached sulphite pulp.

Third Pulp Mill Owned by Company

The Anacortes plant is the third pulp producing unit which the company now owns outright. The other plants are Coos Bay Pulp Corporation at Empire, Oregon, which has an annual rated capacity of 22,000 tons of unbleached sulphite, and Nova Scotia Wood Pulp and Paper Company, a producer of groundwood pulp, located at Charleston, Nova Scotia. The company also owns one-half of the common stock of Brunswick Pulp and Paper Company of Brunswick, Georgia, the other half interest in that company being held by The Mead Corporation. The manufacturing facilities of the Brunswick mill were only recently enlarged, and this plant at present has a rated annual capacity of 60,000 tons of bleached sulphate. Half of the operating time of the Brunswick plant is available to the Scott Paper Company.

Scott Sales Up 11 Per Cent in Year

On releasing the *Stockholder News* to shareholders of the Scott Paper Company today, President Thomas B. McCabe announced net sales of Scott products for the first eight months of this year amounted to $12,876,322.66, representing an increase of $1,275,106.54, or 11 per cent over the same period last year. Continuing, Mr. McCabe says—"While sales of our retail products, Waldorf, ScotTissue, and ScotTowles for kitchen use, are well ahead of last year, sales of Scott industrial products, 'Soft-Tuff,' ScotTissue Towles, Waldorf towels and Scot-Tissue Service Roll, have shown a particularly favorable trend, reflecting increased business activity, as well as the marked quality improvements which were announced in the March *Stockholder News.*" He further said — "It is recognized that increased federal taxes are necessary for the vital work of national defense. However, it is important to point out to our shareholders that corporate income taxes have already been increased and pending legislation provides for substantial excess profits taxes. Such additional tax burdens will of necessity be reflected in your company's earnings."

Company Encourages Evening Study

With the re-opening of schools and colleges, many Scott Paper Company employees, both men and women are encouraged to resume their studies in the evening as the result of the Company's Educational Refund Policy. The purpose of this policy is to make it possible for employees with a year or more service to broaden their education. The company offers to refund all or a large part of the tuition of approved courses, depending upon how successfully the course is completed.

If a grade "A" is received, 100 per cent of the tuition is refunded; for a grade of "B", 80 per cent is returned; a grade of "A" earns a refund of 60 per cent of the tuition paid; and 50 per cent of the tuition is refunded if a grade "A" is received.

Members of the company desiring to participate in the Educational Refund Plan must first have the approval of the Personnel Department for the courses selected.

E. D. Wallin Made Assistant Treasurer

BOSTON, Mass., September 16, 1940—At a meeting of the board of directors of Knight, Allen & Clark, Inc., Eric D. Wallin was made assistant treasurer in charge of credits and as office manager.

Peter MacAdams, who has worked both on stock and in the office for several years, has been appointed a salesman.

In order to enlarge shipping room facilities of Knight, Allen & Clark, the front office has been rearranged for the convenience of customers.

Wisconsin Mills Announce Plant Additions

Central Paper Co. of Menasha and Badger Paper Mills of Peshtigo Award Contracts For New Mill Buildings—Wage Increase Ends Hoskin Strike — Wisconsin Paper Group Meets — Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., September 16, 1940—Two plant additions were announced for Wisconsin mills last week. The Central Paper Company, Menasha, Wis., has awarded a contract to Fluor Brothers Construction Company, Oshkosh, Wis., for a factory and office addition 93 by 132 feet, of brick, concrete and steel. It will adjoin the present factory building, the east wall of which will be removed to provide one large manufacturing area. The office section will be about 45 feet deep, with modern design and interior arrangement.

The major portion will be used for additional manufacturing space for paper converting, and the remainder for storage, to take care of an increasing demand for gummed tape and other products. Work already has been started by a crew of fifteen men, and will probably be completed within two months.

Badger Paper Mills, Inc., Peshtigo, Wis., has awarded a contract to C. R. Meyer & Sons Construction Company, Oshkosh, Wis., for a new building south of the present mill. It will be 240 by 160 feet, of concrete, brick and steel construction. The structure will house an expanded finishing department. Work was to start this week, and was estimated to take four months.

G. D. Muggleton to Succeed Peter Massey

Peter J. Massey, vice-president and general manager of the Combined Locks Paper Company, Combined Locks, Wis., has resigned as general manager, effective September 16, according to announcement made last week. He will be succeeded by G. D. Muggleton, assistant production manager of the Consolidated Water Power and Paper Company's division at Biron, Wis. Mr. Muggleton formerly was associated with the Combined Locks company. Mr. Massey is well known for his invention of a process of coating paper directly on the machine on which it is made.

Rhinelander Sells Building

The Rhinelander Paper Company, Rhinelander, Wis., has sold a building formerly occupied by the Transpara Company, a converting subsidiary, to the city of Rhinelander. The purchase price was $16,250. The building is to be used for the Rhinelander NYA center, and will be remodelled accordingly.

Wage Increase Ends Hoskin Strike

Granting of a five per cent general increase in wages brought to an end last week a week's strike at the Hoskin Paper Company, Menominee, Mich. The employees staged a walkout and placed a picket line at the mill. Non-union workers made no attempt to enter the mill, and there were no disorders. An agreement was finally reached with representatives of the International Paper Workers Union Local No. 281 and the International Pulp and Sulphite Workers Union Local No. 172.

It was also agreed that a meeting would be held after the first of the year to consider an additional wage increase, should business conditions warrant. The present contract with the unions expires October 20, and it is expected a meeting will be held at that time to renew it on the new basis. The wage increase was placed in effect immediately, and covers more than 100 employees.

Wisconsin Paper Group Meets

The Wisconsin Paper Group, made up of representatives of 18 mills, held a meeting at the Bull's-Eye Country Club, Wisconsin Rapids, Wis., September 10. The Group is an organization pooling less than carload shipments to jobbers to provide carload rates. The afternoon was devoted to a blind bogey golf tournament. A business meeting was held following a dinner in the evening to hear reports and discuss problems. Approximately 50 attended. Arrangements were in charge of H. D. Wake of the Consolidated Water Power and Paper Company, Wisconsin Rapids, and Henry F. Fredlund of the Nekoosa-Edwards Paper Company, Nekoosa, Wis.

Displays New "Wet Strength" Paper

Window curtains made from the new "wet strength" paper at the York Haven plant of the International Paper Company were shown the Rotarians of Marientte, Wis., in connection with an address last week by Lewis H. Read, manager of the Marinette, Wis. and Menominee, Mich. plants of the continental division of the Southern Kraft Corporation. He pointed out the durable quality of the product, and said one large company last week placed an order for 50,000 pairs of the curtains. Mr. Read also showed "Flame-proof" paper, an extra refinement of wet strength plastering paper, which will revolutionize plastering in building construction. If the demand for wet paper products continues to increase, he said, it is possible the Marinette mill will begin converting it.

Mr. Read announced that a new machine is to be placed in operation in November at the Marinette mill, increasing output 20 per cent. The cost of manufacturing at this mill is $2,421,000 per year, he declared, and the new machine will step this figure up to $2,925,000. The plant produces 7,500,000 boxes of facial tissues, 25,000,000 rolls of Seminole tissues, and 17,500,000 rolls of Sem and Swank each year. Other items in the coarse paper division include enough wrap for 43,600,000 tires, butcher paper enough for 2,600 markets, and paper bags enough for 204,000 families for a year.

Kimberly-Clark Adopts Prize System

In order to be sure employees read safety posters, a prize system has been adopted at the Kimberly-Clark Corporation's mill at Kimberly, Wis. Punch card numbers appear on the posters each week, and if seen by their owners will entitle them to tickets

redeemable at the mill restaurant. A short article concerning the safety poster on which the number appears must be written and presented before the tickets are issued. The plan will be tried out for the next seven or eight weeks. A safety campaign is now being worked out for the winter months, according to Dudley Courchane, safety director.

Employees Hold Annual Golf outing

Employees of the Kimberly-Clark Corporation's mills at Neenah, Wis., held their twelfth annual golf jamboree and dinner under auspices of the Lakeview (mill) Recreation Association Saturday afternoon, September 7. It was held at Ridgeway golf course at Neenah, and was also the qualifying round for the Kimberly-Clark tournament. Chet Bland won low gross with a 77; Kenneth Buesing, blind bogey; Harvey Thompson, high gross, 149; Robert Stark, second low gross, 80. Other prizes were awarded for various shots, and a goodfellowship list also was included.

Petitions To End Stevens Trust Fund

A petition has been filed in probate court of Winnebago County at Oshkosh, Wis., to terminate the Schuyler Stevens trust fund set up by his grandfather, John Stevens, Sr., which provided that the assets of the fund were to be distributed among the grandchildren of John, Sr. if Schuyler Stevens died without children. The death of Schuyler Stevens occurred recently, and distribution of assets of $69,655.81 is now requested. The decedent formerly was associated with the Dells Pulp and Paper Company, Eau Claire, Wis. One of the grandchildren benefitting from the distribution is John Stevens III, vice-president and assistant general manager of the Marathon Paper Mills Company, Rothschild, Wis.

Mislinski-Rossmeissl Nuptials

Edward Mislinski of Kaukauna, Wis., and Miss Louise Rossmeissl, Appleton, Wis., were married Tuesday morning, September 10, at St. Joseph's church at Appleton by the Rev. Father Cyprian, O. M. Cap. Mr. Mislinski attended the Georgia Institute of Technology and is associated with the Thilmany Pulp and Paper Company at Kaukauna. The couple will reside at Appleton.

Claims Fines Against Box Companies

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., September 16, 1940—Notwithstanding opinion expressed in Ottawa circles that the Dominion will get $161,500 in fines levied against 19 paper box companies for being in a combine in restraint of trade, the city of Toronto has put in its claim for the money, according to Mayor Ralph Day.

On the advice of City Solicitor Colquhoun, the city treasurer has placed a demand on the register of the Supreme Court of Ontario for the entire amount. The city officials feel that they have a just claim to this nice little sum because the indictment of the box companies was made at the city hall under the Criminal Code, and the grand jury is paid by the city.

The trial of the 19 firms lasted from June, 1939, to July, 1940, and in handing down judgment Mr. Justice Hope stated that the Dominion government has sustained a heavy burden of costs in conducting the trial.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 18, 1940—Stanford Paper Company has been awarded the contract for furnishing the Government Printing Office with 6,780 pounds (30,000 sheets) of 32 x 42, 50 per cent rag, double coated book paper at 14.18 cents. Mudge Paper Company will furnish 57,859 pounds (427,800 sheets) of 25 per cent rag, 24 x 33 ledger paper, buff and blue at 8.79 cents and white at 8.89 cents.

Paper Corporation of U. S. will furnish 14,950 pounds (230,000 sheets) of 32 x 42 yellow sulphite manifold paper at 8.65 cents. Paper Corporation of U. S. will also furnish 65,000 pounds (2,000,000 sheets) of 21 x 32 white sulphite manifold paper at 7.9 cents. Bids for all of these items were received on August 23.

R. P. Andrews Paper Company will furnish 3,327 pounds (69,850 sheets) of 100 per cent rag, white bond paper, 18 x 22 at $16.36 per M sheets; 21 x 32 at $25.48 per M sheets; and 22 x 33 at $27.50 per M sheets, bids for which were received on August 19.

Middlesex Products Corporation will furnish 100,000 sheets of 24 x 36 white cloth lined paper at $78.50 per M sheets, bids for which were received on August 16.

Other paper awards include: Lanston Monotype Machine Company will furnish 16,700 pounds of monotype keyboard and casting machine paper at 11.5 cents; Ditto, Inc., will furnish 31,380 sheets of 23 x 36 yellow duplicating paper at $9.54 per M sheets; same firm will also furnish 3,772 sheets of same 23 x 36 white at $12 per M sheets; Cauthorne Paper Company will furnish 1,000 pounds of red sterotype paped in 24 inch rolls at 13.90 cents and 2,000 pounds of same white at 8.96 cents.

Printing Office has received the following bids for 9,750 pounds (300,000 sheets) of 21 x 32 green sulphite manifold paper; Paper Corporation of U. S., 8.78 cents; Whitaker Paper Company, 10.89 cents; Mudge Paper Company, 10.89 cents; Import Paper Company, 9 cents; Graham Paper Company, 9 cents; R. P. Andrews Paper Company, 11 cents; Barton, Duer & Koch Paper Company, 10.75 cents; Enterprise Paper Company, 9.785 cents less 2 per cent; and Walker, Goulard Plehn Company, 9.5 cents.

For 2,500 sheets of 19½ x 23½ gray photo mount board; Mathers-Lamm Paper Company, $33.00 and $59.23 per M sheets; R. P. Andrews Paper Company, $34.90; Whitaker Paper Company, $32.80; George F. Muth & Company, $63.50 less 2 per cent; Hurlock Brothers, $60.12 less 2 per cent; Mudge Paper Company, $31.25; Charles G. Stott & Company, Inc., $62.95; M. G. Ginn & Company, $62.97 less 2 per cent; and Charles W. Speidel & Company, $60.10 less 2 per cent.

William Foulds & Co. Shut Down

MANCHESTER, Conn., September 16, 1940—The mill of William Foulds & Co., paper manufacturers, closed permanently early this month. William Foulds, commenting on the shutdown, stated that there were not enough orders to keep the mill running full time and instead of keeping it on part time, its work will be distributed between the two other paper mills in that locality—the Lydall & Foulds Company and the Colonial Board Company. This shutdown means the laying off of about 40 men.

Northwest Superintendents Hold Meeting

Russell Le Roux Elected Chairman of Northwest Division of American Pulp and Paper Mill Superintendents Association At Annual Fall Meeting — Officers Elected and Two-Day Program.

[FROM OUR REGULAR CORRESPONDENT]

RHINELANDER, Wis., September 16, 1940—Russell Le Roux, superintendent of the Interlake division of the Consolidated Water Power and Paper Company, Appleton, Wis., was elected chairman of the Northwest division of the American Pulp and Paper Mill Superintendents Association at its fall meeting here Friday and Saturday, September 6 and 7. He succeeds Lewis Dozier, superintendent of the Rhinelander Paper Company of this city. The attendance was approximately 200.

Dr. W. F. Hoffman, superintendent of the Northwest Paper Company, Cloquet, Minn., was chosen first vice-chairman, and Harold W. Sherman, superintendent of Northern Paper Mills, Green Bay, Wis., was named second vice-chairman. A secretary will be appointed by the chairman to succeed Walter Strangstad of Rhinelander.

Address by Beloit Engineer a Feature

One address that seemed to interest the superintendents most was that of William Goodwillie, engineer for the Beloit Iron Works, Beloit, Wis. He accompanied his talk with motion pictures of equipment recently installed in the Panama City, Fla. plant of the Southern Kraft Corporation for the manufacture of paper board for containers. The new high speed machine is producing more than 375 tons of heavy paper daily, Mr. Goodwillie said. He described two new devices, the Beloit flow-evener and the center-wind reel. Only a few installations have been made, he said, but thus far they have given highly satisfactory performance.

Mr Goodwillie's address was given at the opening session on Friday at which Robert Kennedy, assistant superintendent of Rhinelander Paper Company, presided. The meeting was held at the Elks club. The remainder of the morning was devoted to informal discussion, including many questions addressed to Mr. Goodwillie.

A stag luncheon was held Friday noon, followed by an afternoon of golf in which 98 participated. Prizes were awarded at a stag dinner at the clubhouse in the evening, at which Ernest Draheim was toastmaster and intertainment was furnished by an orchestra and floor show from Marty's Night Club, Three Lakes, Wis. Prizes were as follows:

First low gross for superintendents: Harold W. Sherman, Northern Paper Mills, Green Bay, Wis.; second low gross for superintendents, Erving McNiare, Northwest Paper Company, Cloquet, Miss.; low net for superintendents, Rudolf Meyer, Badger Paper Mills, Inc., Peshtigo, Wis.

First low gross for salesmen, R. W. Bauman, Johns-Manville Corporation, Chicago; second low gross, George Maye, Appleton Wire Works, Appleton, Wis.; first low net, H. S. Root, Agar Manufacturing Company, Chicago; second low net, Richard Knechtges, Northern Paper Mills, Green Bay, Wis.

Longest drive on No. 2: Lewis Dozier, Rhinelander Paper Company; Closest to pin on No. 8; W. W. Johnson, Rhinelander Paper Company.

Twenty-five goodfellowship prizes also were awarded.

D. C. Everest Awarded Life Membership

Officers were elected at the Saturday morning business session. Another important item was the awarding of an honorary life membership to D. Clark Everest, president and general manager of the Marathon Paper Mills Company, Rothschild, Wis. It was presented by Chairman Dozier, who said it was in recognition of many years of effective work as an executive in the papermaking industry. Since Mr. Everest was in Washington, D. C. conferring relative to his new appointment by Edward R. Stettinius, Jr., of the national defense commission as group executive for the pulp and paper industry, the award was accepted on his behalf by Grover Keith, engineer of the Marathon mills. Charles W. Boyce, vice-president of the Northwest Paper Company, Cloquet, Minn., has been appointed assistant group executive.

Saturday afternoon was devoted to tours of the Rhinelander Paper Company's mill and the Rhinelander logging museum housing relics of early lumbering days, and to golf. A dinner-dance was held in the evening at the Rhinelander War Memorial building.

Women guests were entertained at a luncheon at Jack o'Lantern Lodge, followed by bridge, and an evening dinner at the Oneida hotel, headquarters for the convention. The women also shared the tours of the paper mill and the logging museum.

Forecasting Sales

Planning ahead for production, expense control and employment stabilization are a few of the purposes mentioned by 48 companies in "Forecasting Sales," a new 55 page report issued by the Policyholders Service Bureau, Metropolitan Life Insurance Company.

The report analyzes the factors considered by contributing companies in making forecasts: such as conditions within the company, conditions within the industry and customers' industries, and the general business outlook. The sources most frequently used to gather this information are described.

The study discusses the various ways companies fix responsibility for forecasts as well as the statistical methods used to draw up data and make analyses. The periods covered and interim breakdowns are also discussed.

Forecasting methods, the report states, are most effectively presented by concrete examples. Half the report, therefore, is given over to case studies which illustrate how 19 individual companies are handling forecasting.

Better Tone Reported in Midwest Territory

Little Change In Demand For Paper This Week But Tone of Chicago Market Definitely Improved—Waste Paper Market Rather Quiet — Salesmen Plan Outing — N.P.T.A. Exhibits 41 To Date.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., September 16, 1940—The tone of the wholesale paper market is reported as definitely better in the Chicago area. Specifically, no lines indicated any appreciable upturn in demand and there were some genuinely "soft" areas reported in some instances. All eyes were on the meetings being held in New York City this week and on the merchants conference slated for Chicago the week of the 23rd.

The waste paper market failed to give local commentators any great cheer as, with the exception of a very few grades, these markets were reported as listless. Kraft papers showed no disposition to resume the activity which characterized that market a few weeks ago, demand was only fair and orders reported as "spotty". Bonds and ledgers were unchanged, sulphites finding the market edges sadly in need of some tuning up influence. Books and covers were watching the trend of the two meetings mentioned above while groundwoods and newsprints were in fair demand. Improved sentiment is reported to be coming from the fact that prices must go "upward and not downward" because of heavy operating costs, scarcity of materials and better purchasing power which should eventually extend to the paper and supply industries.

Salesmen Plan Final Outing

"Pat" Patterson, Flambeau Paper Company sales executive and chairman of the golf committee of the Salesmens Association of the Paper Industry, western division, is about prepared to undertake a dual "swan song". Pat winds up a very successful term of office as golf chairman with the final wind-up event slated for the Olympia Fields Country Club on September 26. Inasmuch as the outing will polish off the entertainment features of the National Paper Trade Association, Mr. Patterson is expecting a record attendance. His dual job also finds him in charge of the dinner arrangements at Olympia Fields although no cut and dried program is to be developed. Informality will be the main characteristic of the meeting which brings down the curtain on the 1940 season.

Butler Acquires New Lines

The J. W. Butler Paper Company, Chicago, has recently added several new lines including Blackstone Ledger, Winchester Ledger, Linen Record, Waverly Ledger and Centennial Ledger. The new lines were stocked on September 1 and will give to the well known Chicago jobbing house an even more comprehensive paper service in this territory. The new lines are manufactured by the Byron Weston Company.

Joseph Joyce To Be Honored

Joseph Joyce, Empire Paper Company, Chicago, is to be one of seven charter members of the National Paper Trade Association still active in the paper business who are to be honored by the Paper and Twine Club at its meeting on September 24, held in conjunction with the N.P.T.A. sessions. Suitable mementoes will be given Mr. Joyce and his six associates who will be guests of the club. W. S. Devereax, special agent in charge of the Chicago District of the FBI will be a guest speaker and E. W. Tinker, executive secretary of the American Pulp & Paper Association will present a picture of the paper industry at the present time. Henry Borchardt, chairman of the meetings committee of the Paper and Twine Club, is in charge of the arrangements.

N.P.T.A. Exhibits Total 41 to Date

Forty-one exhibitors are ready to display their wares at the forthcoming fall meeting of the National Paper Trade Association which opens at the Stevens Hotel, Chicago, on September 23. As far as the general program is concerned, local paper merchants who are again glad to have the honor of serving as hosts to the convention, feel that the open Industry meeting on the afternoon of the 23rd may be the real highlight. This is the time and occasion when manufacturers, guests, salesmen, jobbers and all members of the trade are invited to participate in a frank discussion of their general problems.

Association to Join N. P. T. A.

The Chicago Paper Association, now well back in its former position as the leader of the coarse paper business in this area, held its regularly monthly meeting on September 10, presided over by Henry W. Borchardt of the Pilcher-Hamilton Company, head of the local association. The major news of the evening rests in the statement that the Association approved a resolution covering affiliation with the National Paper Trade Association. While the time is too short for the Chicago Paper Association to formulate any specific program in conjunction with the forthcoming annual meeting of N.P.T.A. in Chicago, the local coarse paper group will be represented at the various sessions and will participate in the discussions.

Bermingham & Prosser Add New Lines

Bermingham & Prosser, Chicago, have recently added Dictation Tru-Opaque Bond and Valid Tru-Opaque Bond made by the Fox River Paper Corporation and Lewistrong Leatherette Cover, manufactured by the J. P. Lewis Company. Mead Sales Company's Moistrite Bond is also a new addition to the Bermingham & Prosser Stock.

Smith & Lane Get New Line

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., September 13, 1940—"Tish" cocktail napkins and handkerchiefs constitute a new item put on the market by Beach & Arthur Products, Indianapolis, Ind., manufacturers, of which Smith & Lane Company, Boston, are sales representatives in New England.

Obituary

Willis R. Roberson

Willis R. Roberson, assistant to the director of operations of the Minnesota and Ontario Paper Company died September 6 from injuries suffered in an auto accident near Fort William, Canada.

A veteran in paper manufacture industry at the age of 38, Mr. Roberson began his career in the paper mills at International Falls, became a machine tender, and later was associated with the Abitibi Paper Company at Iroquois Falls, the Fort William Pulp and Paper Company, the Great Lakes Paper Company, the Fort Frances paper mill and the Kenora mill.

Mr. Roberson was assistant to R. W. Andrews, director of operations. While headquartered in International Falls, Mr. Roberson represented the Minneapolis office, and when in Minneapolis, he represented the Minnesota and Ontario mills, the Insulite Co. mills and other subsidiaries. He was also active in the International Falls paper makers union.

He was born in Redfield, S. D. Surviving are his widow and a son Carl in Minneapolis; his parents, and brother and sister, in International Falls.

A. H. Beeler

Aurelius H. Beeler, for 28 years office manager for the Gardner-Richardson Company, Lockland, Ohio, died September 2 at Jewish Hospital after a brief illness. He was 45 years old.

Mr. Beeler was a native of Mechanicsburg, Ohio, but moved to Lockland in his early youth. Recently he moved to his present address, 6757 Siebern Avenue, Silverton.

During the war Mr. Beeler served in the Quartermasters Corps at the Chicago naval base. He was a member of the American Legion.

Besides his wife, Mrs. Isabel S. Beeler, a daughter, Joan, a brother, John, of Lockland, and his mother, Mrs. Ella Beeler, Marysville, Ohio, survive him.

Requiem high mass was sung at St. John Church, Deer Park. Burial was in Glendale Cemetery.

Roy E. Simmons

Roy E. Simmons died at the Providence Hospital in Holyoke, Mass., September 1. For a number of years he had been connected with the Hampden Glazed Paper and Card Company of Holyoke, first with the cost department and more recently with the sales department. His age was 47 years.

He was well liked by the customers whom he served and will be missed by many. For several years he had given much outside time and attention to the Boy Scouts and was an active executive in local Scout affairs.

He leaves a wife and three children.

Fred W. Krause

Fred W. Krause, one of the founders of the Wausau Iron Works, Wausau, Wis., manufacturers of paper mill machinery, died Thursday evening, September 5, at his home in Wausau following a three weeks illness. He had devoted his life principaly to the contracting business but in 1908 joined with C. H. Wegner, T. J. Schott and A. C. Heinzen in organizing the Wausau Iron Works. He became its president and held that office until it was reorganized in 1933. Funeral services were held Monday, September 9, and burial was made in Pine Grove cemetery at Wausau.

Elizabeth D. Kepler

Miss Elizabeth D. Kepler, secretary of the Gibbs-Brower Company, Inc., 21 East 40th street, New York City, died at her home in North Plainfield, N. J., after an illness of several months. Miss Kepler was in the employ of the Gibbs-Brower Company, Inc., for thirty-five years and was well-known to many in the paper and pulp and printing industries from all parts of the United States and Canada, who were customers of her employers. Her record is a very enviable one and her loss is keenly felt by the company to whom she rendered such long and faithful service.

Harold Hughes

Harold Hughes, manager of the Far Eastern Export Department of Parsons & Whittemore, New York, died suddenly on September 16, at the age of 56. Mr. Hughes had a host of friends in the paper trade. He made his start with the Robert Gair Company with whom he was connected for many years and afterwards joined the Pulp and Trading Company as their export manager. He was manager of the Far Eastern Export Department of Parsons & Whittemore for five years. Though he had been in poor health for some time, his sudden passing was quite unexpected as his health seemed to be improving of late.

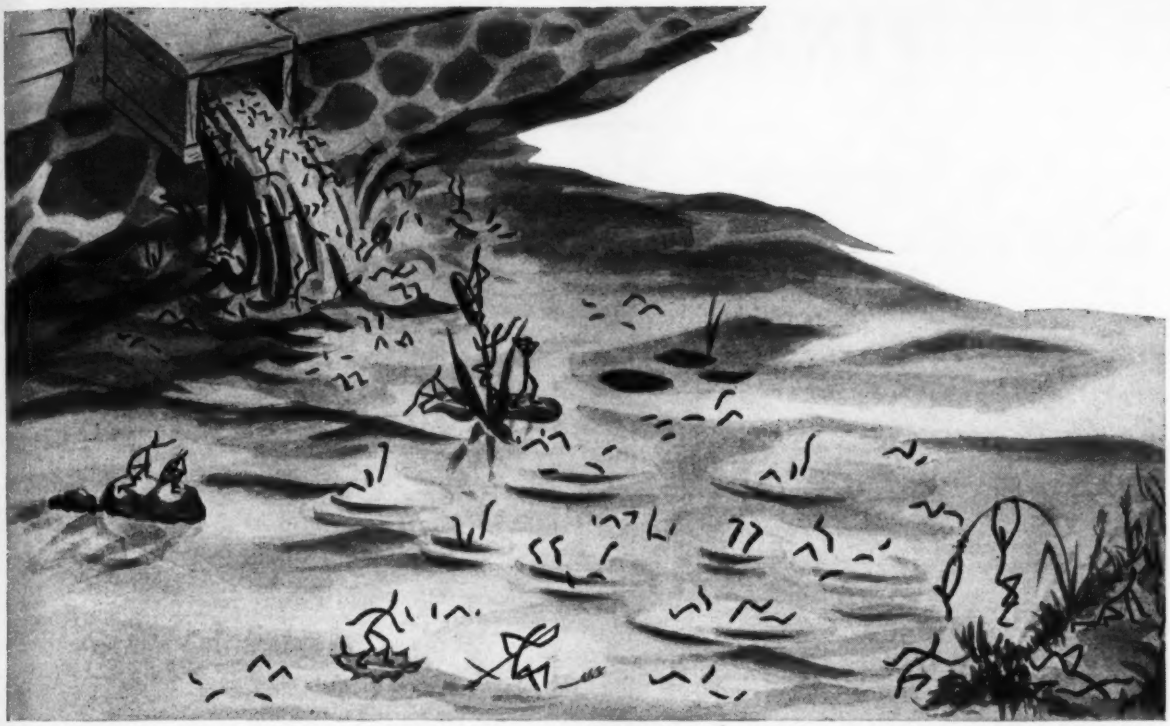
Paper Bought Under Walsh-Healey Act

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 18, 1940—During the week ended August 31 the Government purchased $165,832.58 worth of paper and allied products under the Walsh-Healey Act as follows: $33,565.00 worth of cartons for War Ordnance from Edwin J. Schoettle Company, Philadelphia, Pa.; $35,222.58 worth of paper, target for War Ordnance from Bradner Smith & Co., through Arthur Pickering, Davenport, Iowa; $15,422.50 worth corrugated cartons for War Ordnance from Kraft Corrugated Containers, Inc., South Kearny, N. J.; $28,162.50 worth of toilet paper for War Department from Ashland Paper Mills, Inc., Brooklyn, N. Y.; and $53,460.00 worth of mimeograph paper for War Department from the Barton, Duer & Koch Paper Company, Washington, D. C.

Price of Oxidizing Agents Reduced

Reductions up to seven per cent in the prices of 100 volume Hydrogen Peroxide and of Sodium Peroxide are announced by the R. & H. Chemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. These oxidizing agents are widely used in the textile industry for bleaching purposes. Applications are also found in pharmaceutical, fur, straw, wood pulp and veneers, and starch and glue industries. The change also applies to a special 100 volume Hydrogen Peroxide which is prepared for the food industry.



WHY THROW GOOD STOCK IN THE RIVER?

Stock that has been put through all that expensive processing right up to the point of being made into paper ought never to be allowed to go down the drain with the paper machine waste water . . . *Not any more!* It's too valuable! . . . A simple, low cost Bird Save-All system gets it all into finished product and does it in a way that means maximum net return from every pound of fibre recovered . . . Now is the time to find out exactly what the Bird Save-All can do for you. Say the word and we'll provide the facts and figures.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASSACHUSETTS

BIRD SAVE-ALL

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending September 18, 1940

	High	Low	Last
A. P. W.	2	2	2
Armstrong Cork Co.	33⅛	32⅝	33⅛
Celotex Corp.	6⅞	6¾	6¾
Celotex Corp., pf.	53	53	53
Certain-Teed Products Corp.	4⅝	4½	4⅝
Certain-Teed Products Corp., pf.	23⅝	21¼	23¼
Champion Paper & Fibre Co.	23¾	22½	23⅜
Champion Paper & Fibre Co., pf.	102	101	102
Congoleum-Nairn Co.	17¾	16¾	17¾
Container Corp. of America	14¼	13⅜	14¼
Continental-Diamond Fibre Co.	6⅜	6	6
Crown-Zellerbach Co.	15½	14¾	15¼
Crown-Zellerbach Co., pf.	86½	85½	86
Flintkote Co.	15⅝	14	15⅝
Robert Gair	2⅜	2½	2½
Robert Gair, pf.	12⅛	12	12⅛
International Paper & Power	15⅛	14	15
International Paper & Power, pf.	60¾	56⅜	60½
Johns-Manville Corp.	70	63¾	70
Johns-Manville Corp., pf.	127½	125½	125½
Kimberly Clark Corp.	....	....	....
MacAndrews & Forbes	28½	28¼	28¼
MacAndrews & Forbes, pf.	128	128	128
Masonite Corp.	28	27	28
Mead Corp.	8¾	8½	8⅝
Mead Corp., pf.	....	....	....
Paraffine Companies, Inc.	37	37	37
Paraffine Companies, Inc., pf.	99	99	99
Rayonier, Inc.	17	15⅝	17
Rayonier, Inc., pf.	28⅞	28	28⅞
Ruberoid Co.	15½	14⅛	15½
Scott Paper Co.	41⅛	39⅜	41⅛
Scott Paper Co., pf.	113½	113½	113¾
Sutherland Paper Co.	24½	24½	24½
Union Bag & Paper Corp.	12⅜	11½	12⅜
United Paperboard Co.	....	....	....
U. S. Gypsum Co.	76½	75½	76½
U. S. Gypsum Co., pf.	174½	174	174

New York Curb Exchange

High, Low and Last for Week Ending September 18, 1940

	High	Low	Last
American Box Board Co.	5	5	5
Brown Co., pf.	....	....	....
Great Northern Paper	40	40	40
National Container Corp.	10½	10¼	10¼
St. Regis Paper Co.	2⅜	2⅜	2⅜
St. Regis Paper Co., pf.	65¾	60½	65¾
Taggart Corp.	3¼	3⅛	3¼

Would Protect Junior Abitibi Claims

TORONTO, Ont., September 16, 1940—An appeal to the bondholders protective committee of the Abitibi Power and Paper Company, Ltd., is made by Col. George A. Drew, Ontario Conservative leader, to make some provision in the plan of Abitibi reorganization that will offer rights to the junior security holders.

Col. Drew insists that the proposed foreclosure by the bondholders is no ordinary foreclosure like a foreclosure on real estate. The bondholders of Abitibi, he points out, are holders of a mortgage on public assets (the timber rights). The Ontario government, says Col. Drew, has already asserted its belief that the timber areas held by any company, are held only under a conditional form of ownership. In view of this pronouncement by the government, the bondholders should make some concession to the stockholders rather than risk government intervention, for which, he argues, there are extremely powerful inducements.

M. & O. Paper Reports Loss

The Minnesota and Ontario Paper Company and subsidiaries, excluding European subsidiaries and National Pole and Treating Company reports for the eight months to August 31, a net loss of $1,523,493 and net sales, of $9,250,906.

Minn. & Ontario Plan Urged

The noteholders' protective committee, of which Serge Semenenko is chairman, recommends the acceptance of the reorganization plan for the Minnesota & Ontario Paper Company which has been approved by the Federal Court in Minneapolis. Under the plan, $55,016,538.22 of indebtedness is replaced by $12,200,000 of first and collateral mortgage 5 per cent income bonds and $1,344,544 of new common stock.

All the bonds and 72.59 per cent of new common are to be distributed to the bondholders and 27.44 per cent of the new common stock will go to unsecured creditors. Provision is also made for the distribution of $167,868 in cash, of which $140,500 is distributable to holders of the series A and C bonds of the debtor and $27,368 is distributable to certain of the unsecured creditors. No securities are to be distributed to the old preferred or old common stockholders of the company. Acceptances should be filed before Oct. 25.

Holders of the $3,500,000 notes receive for each $1000 in principal amount, 30 shares of new common stock and $7.50 in cash in discharge of interest maturing March 1, 1931, and interest accrued thereon.

Champion Nets $819,929

The report of the Champion Paper and Fiber Company and its subsidiaries for the sixteen weeks ended on August 18, showed a net income of $819,929 after depreciation, depletion, Federal income taxes and after extraordinary direct and indirect losses approximating $90,000 as a result of flood which interrupted operations of the company's plant at Canton, N. C.

After allowing for preferred dividend requirements, the net income is equal to $1.20 a share on 550,700 common shares. This compares with a net income of $320,377 for the corresponding period last year, which included $401,756 representing proceeds of life insurance policies, equal to 32 cents a share on 551,000 common shares.

Asks Assents For Brown Co.

The bondholders protective committee of the Brown Company, headed by Charles Francis Adams, chairman, and Serge Semenenko, vice chairman, has appealed to holders of first mortgage bonds and of the committee's certificates therefor for increased assents to the plan of reorganization. The committee aims to apply to the court for confirmation of the plan as soon as possible after September 21.

Sutherland Earns $504,066

The earnings of the Sutherland Paper Company were incorrectly stated in a recent issue. The statement should have read the first seven months of 1940 were reported at $540,066 against $303,660 in 1939 period.

BELOIT *Installations*

IN THE SOUTH

29 BELOIT PAPER MACHINES
COMBINED WIDTH 4958 INCHES
123 BELOIT PATENTED SUCTION ROLLS
9 BELOIT PATENTED HORIZONTAL DUAL PRESSES

THE BELOIT WAY BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS. **IS THE MODERN WAY**

BELOIT IRON WORKS BELOIT WISCONSIN

Changes Name to Int'l Tissue Corp.

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., September 16, 1940—Announcement is made here that after October 1 all operations at the Veldown branch of the International Paper Company will be confined to the production of facial and toilet papers, the Veldown product and name having been disposed of to the International Cellucotton Corporation. The name of the local concern is also to be changed to the International Tissue Corporation. According to an official, the Veldown Company has experienced about a fifty per cent increase in the sales of facial tissue and toilet paper. It was also stated that the local concern has combined its sales with the sales of the Seminole Paper Corporation, the principal offices being in New York City, with Herbert Thwaite as sales manager and Ernest K. Hunt as assistant. Mr. Hunt was recently transferred from the South Glens Falls plant where he was sales manager of the Veldown branch for some time. The manufacture of facial and tissue papers is also to be continued at the company's plant at Marinette, Wis. It was also announced that the company is installing another large machine at Marinette to make tissue products and it is believed that within another year the local plant will be undergoing further expansion in order to meet increasing business needs.

This Newsprint Has Its Ups and Downs

The ingenious manner in which the heavy rolls of newsprint are handled by the *San Francisco News* is of definite interest to paper men and engineers. The *News* paper supply is stored on an upper floor in the newspaper's building. The handling problem is a two-fold one: unloading the rolls and getting them up to the storage floor. The solution has involved an unusual double hoist and lift installation which, in conjunction with a special paper grapple, has effectively streamlined the handling of the rolls.

As the rolls are delivered to the receiving door, they are seized by the grapple connected to a P&H Hevi-Lift Hoist, manufactured by the Harnischfeger Corporation of Milwaukee, Wis., operated with push-button control, the hoist raises the rolls from the platform and carries them into a lift. Then the roll *and* hoist are carried up to the storage floor, the lift being operated by another P&H hoist located in the penthouse.

A special lift-out link connects the monorail on the loading platform and the main lift cage. When the link is connected, it opens the electrical circuit so that the lift cannot move up or down. When the link is removed, the circuit is automatically opened.

Thus, newsprint is unloaded, raised to the storage floor, and lowered again when needed in the press room. This P&H hoist system has streamlined the handling of the rolls so that the man on the street, whether he knows it or not, has double assurance of having his regular evening edition of the San Francisco *News*.

New Model "B" Feeder

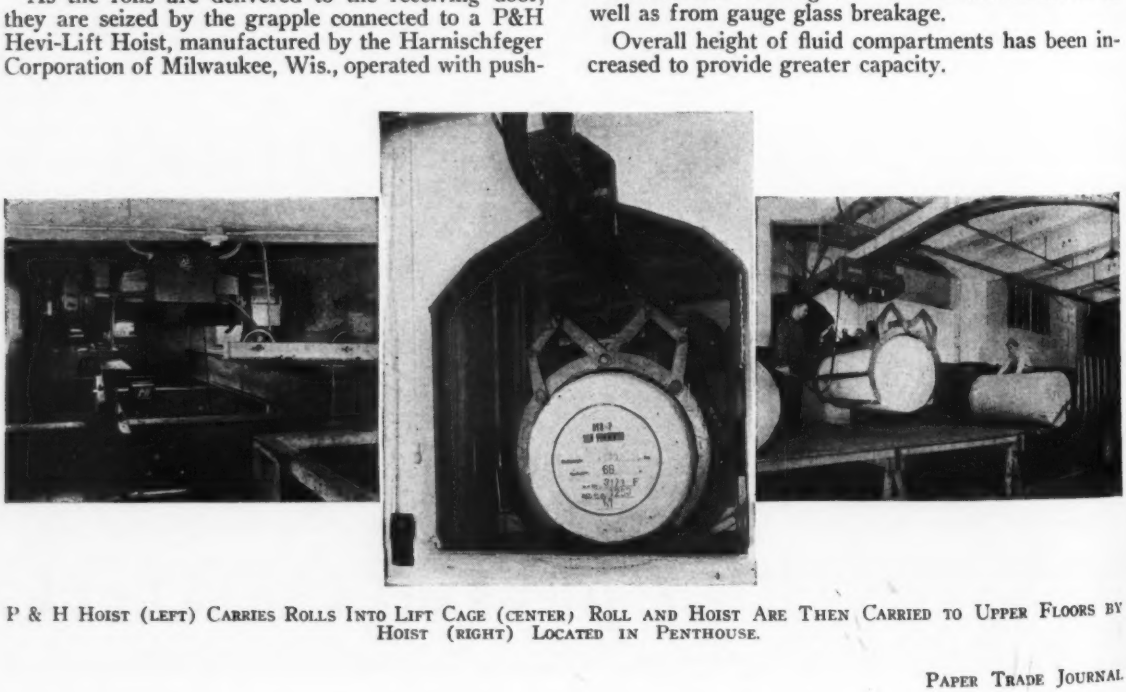
D. W. Haering & Co., Inc., 2308 S. Winchester Ave., in Chicago, Ill., announce the introduction of a new and improved Model "B" Feeder employing the famous Haering Fluid Piston Principle for proportioning liquids into liquids or gases. Operating on the pressure difference between pitot tubes, these units offer accurate, trouble free proportioning without the use of motors, meters, or pumps.

Improvements in the new Model "B" Feeder include the use of flexible steel tubing on pitot tubes and cross lines to take up the stress and shock of water hammer or slight misalignments due to curling of welded connections.

The check valve is now installed on the needle valve line where it prevents reagent backing into the needle valve line and is not subject to clogging or corrosion thus assuring perfect check valve performance and better drop feed indication.

Both gauge glasses are now installed on the inside of the units facing each other. This protects gauges from accidental damage and reduces the hazard of as well as from gauge glass breakage.

Overall height of fluid compartments has been increased to provide greater capacity.



P & H HOIST (LEFT) CARRIES ROLLS INTO LIFT CAGE (CENTER) ROLL AND HOIST ARE THEN CARRIED TO UPPER FLOORS BY HOIST (RIGHT) LOCATED IN PENTHOUSE.

Wins Marathon Safety Contest

Local No. 319 has been declared the winner over Local No. 217 in a safety contest at the Rothschild division of the Marathon Paper Mills Company. The victor had a perfect score.

All divisions of the Marathon Paper Mills Company have taken keen interest in safety programs, as indicated by a general reduction of 62 per cent in lost-time accidents since July 1, 1937. Last November at the suggestion of George Messerknecht, Local No. 319 of the International Brotherhood of Paper Makers challenged Local No. 217 of the International Brotherhood of Pulp Sulphite and Paper Mill Workers to a six months contest, beginning December 1, 1939 and ending May 3, 1940. It was agreed that irrespective of the final score the Marathon company would furnish a dinner to all union members at the Rothschild division, the members of the losing union would wait on table and wear appropriate placards reading, "I am in the dog house."

At the completion of the contest, Local No. 319 had no lost-time accidents, while Local No. 217 had five, or a frequency rate of 12.27 lost-time accidents, a reduction of over 70 per cent from the same period in 1938-1937.

Over 300 employees and guests of the company attended the supper. The toastmaster was P. M. Wilson, secretary and treasurer of the Marathon Paper Mills Company. Short talks were given by Clayton Braatz of the department of industrial relations, Jack Schneider, president of Local No. 319, Milton Ohlsen, president of Marathon Local No. 217, George Messerknecht, chairman of the adjustment committee of Marathon Local No. 319, Rasmus Anderson, representative of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, Emil Noren, representative of International Brotherhood of Paper Makers, Voyta Wrabetz, chairman of the Industrial Commission of Wisconsin, R. McA. Keown, chief engineer of the Industrial Commission of Wisconsin, and D. C. Everest, president of the Marathon Paper Mills Company.

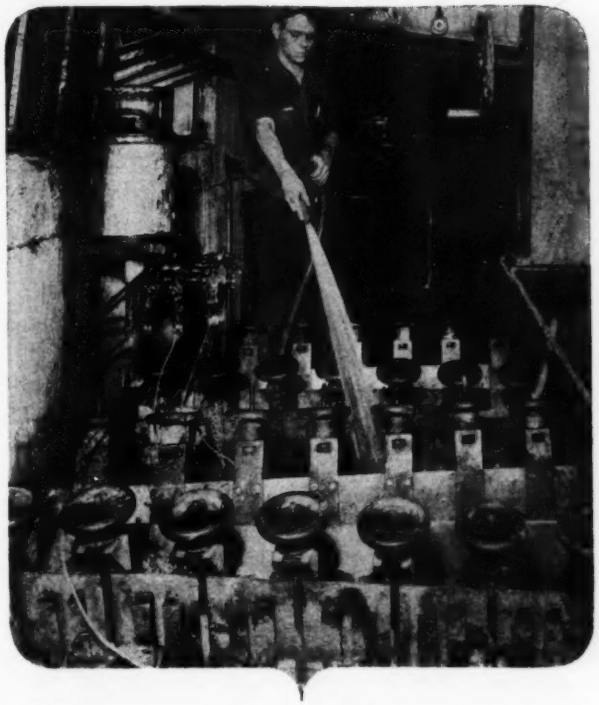
After the short talks entertainment was furnished by a troupe from Milwaukee. Through the courtesy of Employers Mutual Liability Insurance Company a trophy was given to the president of Marathon Local No. 319 for winning the contest. The trophy is a highly decorated wine cask and will be kept on display in an appropriate case in the time office of the company.

Guests of the company at this dinner included the three industrial commissioners from Wisconsin: Voyta Wrabetz, H. J. Burczyks, and D. L. Miler, chief engineer of the commission; R. McAllister Keown, the international representative of both unions; Messrs. Anderson and Noren, and the chief engineer and his assistant of Employers Mutual, Messrs. F. W. Braun and Clyde Schlueter.

Howard B. Lee Visits Boston

BOSTON, Mass., September 16, 1940—Howard B. Lee and his foreman, Mr. Hartley, of Clint W. Lee Company, Seattle, Wash., one of the largest diploma makers in the West, were guests of Henry Ford, manager of the fine paper specialties department of the Andrews Paper Company, Thursday, September 5.

Only 10 Minutes of This... AND IT'S CLEAN!



• When flow boxes in this paper mill were made of wood, clean-up crews washed and scrubbed for nearly an hour. Even so, in the words of the superintendent, "It was a half-done job. We never could get them really clean."

Now, with flow boxes made of ARMCO Stainless Steel, cleaning is a 10-minute job. Only a hose and water under pressure are needed. Scrubbing is out. What's more, this rustless metal is clean and smooth after every wash.

Result: Lower operating costs and better paper! Costly slime accumulation is greatly retarded by the always-smooth, hard surface of ARMCO Stainless. This means cleaner equipment, fewer weak spots and breaks in paper. And there's no rust to damage paper stock.

Let ARMCO Stainless Steels help you produce cleaner, more salable paper at lower cost. Just write us for complete data the next time you have an equipment problem. The American Rolling Mill Company, 2701 Curtis Street, Middletown, Ohio.

ARMCO Armco

STAINLESS STEELS

CONSTRUCTION NEWS

Bogalusa, La.—Gaylord Container Corporation, Pulp and Paper Division, 2820 South 11th street, St. Louis, Mo., manufacturer of corrugating paper, wrapping papers, container liner and kindred stocks, plans expansion and improvements in mill at Bogalusa, including new production units with equipment installation for large increase in present capacity. Company is arranging financing in amount of $5,000,000, considerable part of fund to be used for purpose noted.

St. Marys, Ga.—The St. Marys Kraft Corporation, St. Marys, recently chartered with capital of $1,000,000, as noted in these columns, will be an interest of the Gilman Paper Company, Gilman, Vt., Charles Gilman, vice-president, manufacturer of kraft and news stocks. New company has arranged for purchase of tract of about 80 acres of land on North River in vicinity of St. Marys, which is about 35 miles north of Jacksonville, Fla., and will use as site for new pulp mill, for which plans will be prepared at once. Plant will comprise several large one and multi-story units, with power house, pumping station and auxiliary structures, and will be equipped for an initial output of about 30,000 tons of wood pulp per annum. It is reported to cost in excess of $1,000,000, with machinery. Completion is scheduled early next spring. Company has arranged for purchase of the St. Marys-Kingsland Railroad, running near mill site, and will improve and operate in conjunction with new mill. Arrangements have been made with the Seaboard Railway Company to carry out the latter work.

Maspeth, N. Y.—The Great Eastern Packing and Paper Stock Corporation, 43-35 Twenty-fourth street, Long Island City, New York, wrapping and other paper stocks, has leased a two-story industrial building at 53-01 Grand avenue, Maspeth, Queens Borough, totaling about 40,000 square feet of floor space, and will occupy for expansion, including storage and distribution facilities. Structure is now used by Atlantic & Pacific Tea Company, which will remove to a new location.

Easton, Pa.—The Individual Drinking Cup Company, Inc., 24th street and Dixie avenue, manufacturer of paper drinking cups, plates, etc., has approved plans for new addition to plant for large increase in present capacity, to be three-story, 100 x 120 feet, reported to cost about $100,000, including equipment. General erection contract has been awarded to the Lauter Construction Company, 1613 Sansom street, Philadelphia, Pa., and work will be placed under way at once. This company is a subsidiary of the Dixie-Vortex Company, 421 North Western Avenue, Chicago, Ill., manufacturer of kindred products, which will also build an addition to plant, as recently noted in these columns. Latter project will comprise a six-story and basement structure, 60 x 120 feet, estimated to cost close to $200,000, with equipment, and similarly will provide for increased capacity. An award for masonry and carpentry work has been let go to the J. W. Snyder Company, 307 North Michigan avenue, Chicago, which will proceed with superstructure at early date. Niestadt & Love, 343 South Dearborn street, Chicago, are architects.

St. Louis, Mo.—The Waxide Paper Company, 1525 South Newstead avenue, manufacturer of waxed and other processed papers, has plans under way for new addition to plant, to be one-story, 50 x 100 feet, reported to cost approximately $45,000, with equipment. Bids are scheduled to be asked soon on general erection contract. Leonhard Haeger, 3844 Utah place, St. Louis, is architect.

Brevard, N. C.—The Ecusta Paper Corporation, manufacturer of cigarette papers, has begun construction of new additions to mill, recently referred to in these columns, and will expend approximately $2,000,000 for an expansion program, instead of smaller sum, previously noted. The capacity of the mill will be doubled, with project to comprise several large one and multi-story buildings for production service, and miscellaneous operating units; considerable increase in present storage and distributing facilities will be provided. Work is scheduled for completion early in July 1941. J. E. Sirrine & Co., Greenville, S. C., are consulting engineers.

Norwood, Mass. — Bird & Son, Inc., East Walpole, Mass., manufacturer of wall board, press board and other paper board products, has awarded general contract to Reardon & Caducci, Nichols street, Norwood, for new two-story plant at Norwood. It will be 62 x 90 feet, reported to cost over $50,000, with equipment. Erection will be placed in progress at once. Ganteaume & McMullen, 99 Chauncy street, Boston, Mass., are consulting engineers.

Nitro, W. Va.—The American Viscose Corporation, Delaware Trust Building, Wilmington, Del., manufacturer of cellulose rayon products, has completed plans for new addition to boiler plant at branch mill at Nitro, to include installation of new boiler unit and auxiliary equipment for considerable increase in present capacity. Cost is reported over $45,000, with equipment. Bids are being asked on general erection. Ballinger Company, 105 South 12th street, Philadelphia, Pa., is architect and engineer.

New York, N. Y.—The Continental Can Company, 100 East 42nd street, has authorized a large expansion program over a period of 36 months, with total investment approximating $25,000,000 in time. Work will include extensions and improvements in different plants used for the manufacture of corrugated paper boxes and containers in various parts of the country, with considerable increase in present production facilities in this branch of company operations.

Lynchburg, Va.—The Mead Corporation, Heald Division, manufacturer of paper board products, has plans maturing for proposed new addition to

local mill, previously referred to in these columns, and will ask bids for general erection at early date. It will be one-story, about 100 x 300 feet, used for expansion in laminated board-manufacturing department; a new laminating machine and auxiliary equipment will be installed, as well as traveling crane for handling paper rolls, and other mechanical handling-facilities. Cost is reported close to $100,000, including equipment. Main offices of parent company are at Chillicothe, Ohio.

Fort Edwards, Wis.—The Nekoosa-Edwards Paper Company, Inc., manufacturer of writing and other paper stocks, has awarded general contract to Stephen Feith, 2141 Eighth street South, Wisconsin Rapids, Wis., for new one-story addition to mill, about 40 x 55 feet, to be used for office and operating building. Work on superstructure will proceed at once. No estimate of cost announced. Donn Hougen, 132 East Grand avenue, Wisconsin Rapids, is architect.

Three Rivers, Que.—The Consolidated Paper Corporation, Ltd., Sun Life Building, Montreal, Que., is reported planning expansion and improvements in branch mill at Three Rivers.

N. E. Wrapping Paper Men Meet

BOSTON, Mass., September 16, 1940—An important meeting of the Wrapping Paper Division of the New England Paper Merchants Association was held Thursday, September 12, at the Boston Chamber of Commerce. Vice-President Gilbert T. Singleton of the association, presided, with a good attendance.

Whiting-Plover Adds A Line

After many months of experimental work, the Whiting-Plover Paper Company of Stevens Point, Wis., announces an addition to its line of Permanized Papers. The new line, to be part of the "Permanized Family," will be known as Permanized Letter and will be distributed through the customary channels.

Designed for use on fine letterhead jobs of a distinctive and semi-personal nature, as well as for many other purposes such as refined brochures, announcement folders, etc., this 25 per cent Rag Content sheet will be offered in a wide variety of sizes, weights, formations and colors. The Mill will carry White and Ivory in both Laid and Wove in Substances 20, 24 and 28.

One very interesting feature of this announcement is the statement Whiting-Plover makes regarding the White in this line: "A real innovation of ours, something entirely new in the old craft of paper-making, has been developed especially for the manufacture of Permanized Letter. We have reference to the white which is brilliant beyond the power of adjectives to describe. We aren't even going to try; instead, we simply ask you to look at it and compare it with other sheets that you think are white."

Complete plans have been made and are now being executed for the introduction of this new line. In addition to a very complete and attractive sample book, a striking portfolio has been prepared. This portfolio is lithographed in three colors and, besides the sample swatch, contains examples of a printed, an engraved and a lithographed letterhead, as well as several envelopes to match.

R & M MOYNO PUMP

Helps Improve Your Paper Quality . . .

Heavy liquids are handled easily, uniformly by the R & M Moyno Slip Pump. Forward or backward flow of slip is definitely sealed by the rotor and an even, generous feed to the coating rolls results . . . without foaming, turbulence or cavitation.

There are no valves or pistons to stick, leak, clog or wear out. That's why the R&M Moyno Slip Pump gives longer, more satisfactory service in paper manufacturing.

The eccentric rotor does the pumping. It revolves within a double-threaded helical stator, creating action like that of a piston moving continuously through an endless cylinder.

USED IN LEADING PAPER MILLS

R & M Moyno Slip Pumps are giving satisfactory performance in 20 large paper mills. Not only are they minimizing maintenance costs but *also* improving the quality of paper. Names of these mills will be gladly furnished on request.

Robbins & Myers can help you cut costs and improve production methods. Mail a post card or letter now for complete details on the R & M Moyno Slip Pump—the pump that can "take it" in paper industry service.

ROBBINS & MYERS, Inc.

MOYNO PUMP DIVISION • SPRINGFIELD, OHIO

PAPER TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR
Vol. 111 September 19, 1940 No. 12

COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

National Safety Council, Paper and Pulp Section, Annual Meeting, Stevens Hotel, Chicago, Ill. October 7-11.

National Paper Trade Association, annual Fall Meeting, Stevens Hotel, Chicago, Ill. September 23-25.

INDUSTRY AND DEFENSE

A substantial part of current opinion is concerned with two phases of the national defense program, one being the possibility of invasion of the United States and the other the measures to "take over" industrial plants provided in the powers granted the President in the Burke-Wadsworth Selective Service Bill.

Although a recent survey concluded that four out of ten Americans expressed fear of an invasion of this country if Great Britain is defeated, this is a long range view and the fortunes of belligerency seem at this date as likely to change to modify that opinion as to strengthen it. Public opinion is now more than ever in a state of flux and even if it was possible to accurately reflect the prevailing trend of thought, circumstances shift and opinion correspondingly alters. It may be of some reassurance to also consider that as the huge national defense program progresses the shadow of a hostile power recedes.

The more immediate future and the effect of government decrees on industry are of more importance to the business man at the present time. Not all industrial plants, of course, directly contribute to the production of goods most essential to the fulfillment of the defense program, but all business activity is a factor to be considered and as the whole national economy is affected, so must all Americans experience in some degree the inauguration of such a costly, huge and complex project now in progress for assuring the security of this country.

Drafting of industry or coercing the productive capacity of the nation in some form, has seemed likely to emerge from the high state of feeling demonstrated in Congress. The final form of the legislation agreed upon by the Senate and House conferees created on September 14 a law that compels industry and all business to accept and fill all defense orders and to protect the government against recalitrant firms. The advocates of this measure have frequently stated in legislative sessions that a law for the compulsory acceptance and execution of orders for defense, under threat of operation by the Federal Government, may never be used but that it will form a powerful persuasive influence for industrial plants reluctant to accept government contracts. The Burke-Wadsworth Selective Service Bill provides the conscription of men from 21 to 35 years of age. It states that an employer is obliged to consider as on furlough or leave of absence all selectees taken from his employ and to grant to them such insurance or other benefits as he customarily grants to employees on such status and is under the obligation to restore them to their jobs when they have finished their service. He may not fill their places, during their absence, with members of the Communist party or the German-American Bund.

The provisions for industrial draft may be summarized thus: A manufacturer must accept and execute, on "fair and just" terms, orders for materials or products needed in the national defense when called upon to do so by the President, and is liable to imprisonment for not more than three years and a fine of not more than $50,000 for refusing to execute such an order. In addition, the President may take over the plant and operate it directly or through a contractor, paying whatever rental he deems "fair and just" for the time the government has possession of it. The bill also provides that individuals having contractual relations for installment purchase and sale may cancel those contracts by mutual agreement, but the seller may not enforce repossession proceedings for nonpayment of installments during the time the selectee is in the military service.

Section 9 of the bill on conscripting industry states: "Compliance with all such orders for products or material shall be obligatory on any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof and shall take precedence over all other orders and contracts theretofore placed with such individual, firm . . . thereof owning or operating any plant equipped for the manufacture of arms or ammunition or parts of ammunition, or any necessary supplies or equipment for the Army or Navy, and any individual, firm . . . owning or operating any manufacturing plant, which, in the opinion of the Secretary of War or the Secretary of the Navy shall be capable of being readily transformed into a plant for the manufacture of arms or ammunition, or parts therefor, or other necessary supplies or equipment, who shall refuse to give to the United States such preference in the matter of the execution of orders, or who shall refuse to manufacture the kind, quantity,

or quality . . . at a reasonable price as determined by the Secretary of War or the Secretary of the Navy . . . then the President, through the head of the War or Navy Departments, in addition to the present authorized methods of purchase or procurement, is hereby authorized to take immediate possession of any such plant or plants, and through the appropriate branch . . . to manufacture therein such product or material as may be required. . . . The compensation to be paid to any individual, firm . . . for its products or material, or as rental for use of any manufacturing plant while used by the United States, shall be fair and just; provided, that nothing herein shall be deemed to render inapplicable existing State or Federal laws concerning the health, safety, security, and employment standards of the employees in such plant."

From the exerpts given of the Burke-Wadsworth Selective Service Bill, it may be noted that the power conferred upon the President is greater than that of the National Defense Act of June 3, 1916, which contains a provision that defense orders should be given priority and plants for that purpose might be requisitioned. None of the more drastic provisions of this act was invoked when the United States entered the world conflict. It has been suggested that in some cases, this may have resulted in the clear understanding of all industry that the power to take over plants existed, but reports at that time attributes much of the praiseworthy cooperation of private industry to the policies of the War Industries Board. The main difference between the 1916 act and the present bill is that the former only became operative upon the declaration of a state of war in April, 1917, while the Burke-Wadsworth Selective Service Bill contemplates imposing compulsion upon private industry in a time of peace when no government spokesman has admitted that war is imminent.

Argentina Exports More Casein

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 18, 1940—Casein exports from Argentina to the United States in 1940 will probably be considerably larger than in any other recent year, according to Vice-Consul J. D. Walstrom at Buenos Aires. Exports to the United States reached 5,592 short tons in the first half of 1940. Comparable figures for earlier years were not submitted. In the calendar year 1939, however, casein exports to the United States amounted to 8,768 short tons, a material increase over the figures for 1937 and 1938.

In 1937 and 1938 exports to the United States represented less than 7 per cent of the total exports of Argentine casein. The United Kingdom, Germany, and Japan usually outranked the United States as a buyer. In 1939, however, the United States took 40 per cent of the total, and this year exports to the United States through June represented 50 per cent of the total movement. None has been sent directly to Germany in 1940, while exports to all other takers have been on a much smaller scale than formerly.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1940	1939	1938	1937	1936	1935	1934
January	90.2%	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	86.2%	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	83.9%	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	86.3%	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	91.7%	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	93.8%	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	87.1%	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	87.3%	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	.....	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	96.6%	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	97.2%	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	91.1%	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	84.9%	72.3%	80.6%	81.3%	70.5%	.....
First 36 weeks	88.0%	80.5%	69.4%	87.4%	79.0%	69.0%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1940		CORRESPONDING WEEKS, 1939	
August 3	89.4%	August 5	80.5%
August 10	90.1%	August 12	82.9%
August 17	86.6%	August 19	82.9%
August 24	86.7%	August 26	83.3%
August 31	85.7%	September 2	85.0%
*September 7 (Holiday Week)	71.3%	September 9	74.0%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Aug. 3, 1940	Aug. 10, 1940	Aug. 17, 1940	Aug. 24, 1940	Aug. 31, 1940	Sept. 7, 1940
0% to 50%	47	46	56	54	50	61
51% to 100%	250	246	235	237	231	169
Total Mills Reporting	297	292	291	291	281	230

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%
1940	71%	70%	69%	70%	76%	79%	72%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	81%	71%	70%
1940	74%	....	....	....	....	....

Week end. Aug. 3, 1940—74%
Week end. Aug. 10, 1940—74%
Week end. Aug. 17, 1940—73%
Week end. Aug. 24, 1940—74%
Week end. Aug. 31, 1940—74%
Week end. Sept. 7, 1940—60%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

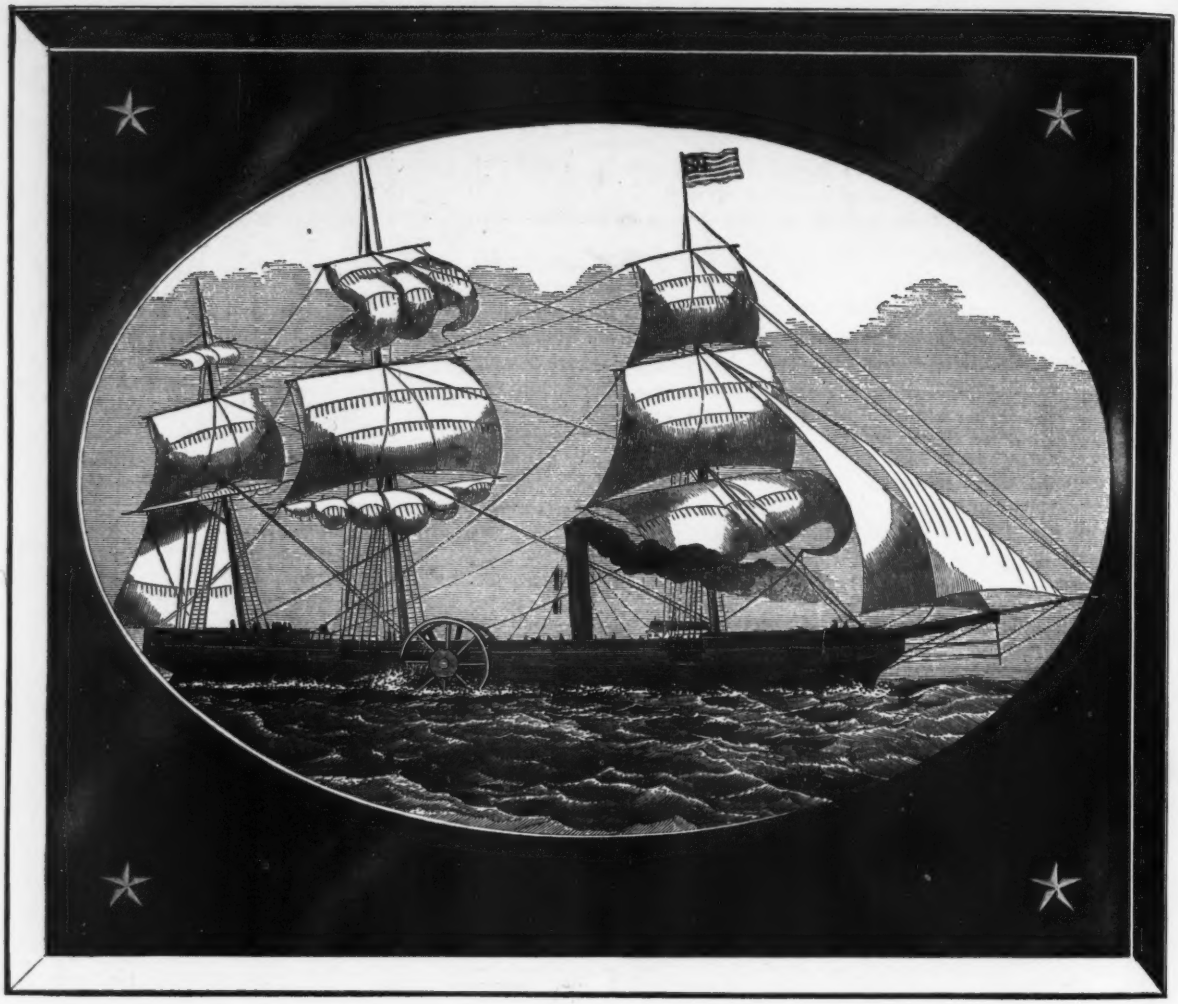
* Preliminary figure.

A. J. Nydick Appointed

The American Council of Commercial Laboratories has just announced the appointment of A. J. Nydick to the office of executive secretary.

The council, which was organized in 1937, is made up of testing and research laboratories located throughout the country. The A.C.C.L. was formed by the laboratories to serve as a clearing house for the dissemination of scientific and testing research information to its various members and to serve as a control board in the maintenance of high standard professional ethics in the fields of testing and research.

Mr. Nydick is associated with Garey & Garey, Esqs., at 63 Wall street, New York City. He is representative in Pennsylvania for the American Chemical Society and serves as general counsel for the Pennsylvania Chemical Society and is, therefore, well versed in the industrial and consumer fields with which the Council is associated.



They Started Something!

THE FIRST crossing of the Atlantic by a steamship revolutionized the future course of industry and commerce. When the Savannah completed her voyage in 1819, ocean shipping was freed from its dependence on variable winds. The steamship, only a few years earlier regarded as an impractical toy, proved its value as a new tool of commerce. With the shortening of the time needed for transatlantic crossings and the establishment of regular, dependable shipping schedules, new markets were opened for the products of agriculture and industry. And new raw materials became available to stimulate industrial growth.

Equally striking advances in industrial development have been made possible by the efforts of American scientists and engineers who have opened new domestic sources of raw materials needed by industry. When EBG engineers first made Liquid Chlorine commercially available in America, they too began a new era, not only in industry but in public health as well. Municipalities found in EBG Liquid Chlorine a new and remarkably effective means of purifying water supplies to prevent the spread of water-borne diseases. Today they are using it also in constantly increasing quantities to sterilize sewage and to reduce stream and river pollution with all its attendant evils. And in the paper and textile industries, EBG Liquid Chlorine has made possible new standards of bleaching efficiency. EBG engineers were the pioneers in the domestic production of Liquid Chlorine. You can profit by their extra years of experience in manufacturing and servicing.

The first cylinder of Liquid Chlorine made by EBG in 1909.

ELECTRO BLEACHING GAS COMPANY
Main Office: 60 East 42nd Street, New York, N.Y.
Plant: Niagara Falls, N.Y.

EBG Liquid Chlorine

FIRST IN THE COUNTRY

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Hydrogen Ion Concentration and Pentosans

Report of Cooperative Tests of TAPPI Subcommittee on Chemical Methods

By P. F. Wehmer[1]

The chief activity of the subcommittee on Chemical Methods of the Technical Association of the Pulp and Paper Industry during the past year was the "round-robin" testing of papers for *p*H value of their water extracts and for pentosans.

A proposed revision of TAPPI Standard T 435 m (Hydrogen Ion Concentration of Paper) and a proposed standard method for determining pentosans having been submitted to the TAPPI Paper Testing Committee, the Subcommittee on Chemical Methods was asked to secure test data for evaluating the methods.

Samples Furnished by Testing Committee

The chairman of the Paper Testing Committee furnished samples of six types of paper—2 all-rag, 1 sulphite-soda book, 1 all-sulphite, 1 all-soda, and 1 no. 1 soft alpha paper. These were sent to 7 laboratories cooperating in the tests, and they were asked to determine the *p*H value of the water extract of each paper in each of 4 ways—hot and cold extraction of the ground and unground paper. They were also asked to determine the pentosans in ground specimens of each of the 6 papers, using the proposed method.

The proposed revision of standard T 435 m is based upon the work of H. F. Launer, published in Research Paper RP1205 of the National Bureau of Standards. It prescribes "cold" extraction—that is, extraction of the unground paper at room temperature, for 1 hour for thin to medium thick papers and for up to 20 hours for very thick papers. The method also calls for measuring the *p*H value of the unfiltered paper-water mixture. These are the chief three changes from the present standard T 435 m, which calls for "hot" extraction, that is, extraction of the ground paper at 95 to 100 deg. C. for 1 hour and measuring *p*H value of the filtered paper-water mixture.

The proposed standard method for pentosans is also based on the work of H. F. Launer, published in Research Paper RP1199, of the National Bureau of Standards. In this method the furfural formed by the action of hot hydrochloric acid on the paper pulp is distilled from the mixture and is determined in the distillate by a volumetric procedure, wherein a known excess of potassium bromate-bromide is added to the cold (0 to 2 deg. C.) furfural-hydrochloric acid mixture, the liberated bromine is allowed to react for 5 minutes, after which the unused bromine is determined iodometrically. This manner of measuring the furfural is the chief variation from

[1] Member TAPPI; Chairman, TAPPI Subcommittee on Chemical Methods; Electrical Testing Laboratories, New York, N. Y.

TABLE I.—pH VALUE OF WATER EXTRACTS

Unground Paper

Sample	999 Extract		1014 Extract		1137 Extract		1227 Extract		1236 Extract		1253 Extract	
Laboratory	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot
1	6.5	6.5	5.4	4.9	5.5	4.7	5.4	4.7	5.9	5.2	5.8	4.8
2	6.6	6.4	6.3	5.6	5.85	4.9	5.95	4.9	6.3	5.6	6.4	5.2
4	6.0	..	5.3	..	5.8	..	5.5	..	5.5	..	5.7	..
5	6.59	6.72	5.54	5.29	5.7	5.05	5.73	5.12	5.89	5.45	6.23	5.27
6	6.3	6.25	5.5	5.1	5.5	4.9	5.6	4.9	5.7	5.2	5.9	5.2
7	6.1	6.26	5.38	4.84	5.59	4.62	5.47	4.8	5.73	4.85	5.8	4.6
Average	6.35	6.42	5.57	5.15	5.66	4.83	5.61	4.88	5.84	5.26	5.97	5.01
Max. deviation from ave..	0.35	0.30	0.73	0.45	0.19	0.22	0.34	0.24	0.46	0.41	0.43	0.41
Max. deviation between labs.	0.60	0.47	1.00	0.76	0.35	0.43	0.55	0.42	0.80	0.75	0.70	0.67
Ground Paper												
Laboratory												
2	6.4	..	6.3	..	5.9	..	5.9	..	6.3	..	6.2	..
3	6.5	..	*	..	5.5	..	5.6	..	5.8	..	6.4	..
6	6.3	6.35	5.55	5.3	5.5	5.1	5.5	5.0	5.8	5.2	5.95	5.2
Average	6.4		5.93		5.63		5.67		5.97		6.18	
Max. deviation from ave..	0.1		0.38		0.27		0.23		0.33		0.23	
Max. deviation between labs.	0.2		0.75		0.4		0.4		0.5		0.45	

* Result of 7.5 pH reported not used in summation. The sample used had evidently become contaminated. A check test of this sample, by the same laboratory gave a result of 7.7 pH.

the method generally used, that of the Association of Official Agricultural Chemists.

Following is a list of the papers used in the tests:

CHARACTER OF PAPER

Sample	Fiber composition	Date manufactured	Ash *	Rosin *	Glue *
			Percentage by wt. of paper dried at 105 deg. C.		
999	All-rag	Mar. 7, 1933	0.1	0.2	None
1014	All-rag	June 13, 1933	0.4	1.7	1.6
1137	Sulphite-soda .	Oct. 23, 1936	7.2**	1.6	None
1227	All-sulphite ...	Dec. 22, 1938	0.3	0.8	None
1236	All-soda	Mar. 15, 1939	0.6	0.7	None
1253	No. 1 soft alpha	July 26, 1939	0.3	0.7	None

* Determined on ground paper. ** 9.2 in unground paper.

Following is a tabulation of the results reported by the laboratories for *p*H value:

Type of Apparatus and pH Value of Distilled Water Used

Laboratory	Apparatus: Indicator	Apparatus: Electrode	pH Value of Water
1	Leeds & Northrup	glass	6.0 to 6.6 before testing, not over 7.0 after testing
2	Coleman	glass	not stated
3	Coleman	glass	7.0
4	Beckman	glass	6.8
5	Beckman	glass	6.4
6	Beckman	glass	6.4
7	Leeds & Northrup	glass	5.5

Following is a tabulation of the results reported by the laboratories for pentosans:

PENTOSANS, PERCENTAGE BY WEIGHT OF CELLULOSIC MATERIAL

Sample:	999	1014	1137	1227	1236	1253
Laboratory						
1	0.4	0.6	10.6	4.2	14.9	2.6
2	0.4	0.4	9.9	3.2	14.1	1.5
6	0.3	0.5	10.1	4.5	14.3	2.1
7	0.2	0.5	12.0*	4.7	16.9*	2.8
Average	0.3	0.5	10.7	4.2	15.1	2.3
Max. deviation from ave.	0.1	0.1	1.3	0.55	1.8	0.8
Max. deviation between labs.	0.2	0.2	2.1	1.5	2.8	1.3

* Average of 2 tests. The laboratory's individual results for these two samples are as follows:

Sample:	1137	1236
Test 1.....	12.5	17.2
Test 2.....	11.4	16.6
Average	11.95	16.9

Results of Tests

The results of the tests for *pH* value indicate: that, for the types of paper used in the tests, it is not necessary to use ground specimens. This agrees with the findings of Dr. Launer and of Drs. Browning and Ulm. The following table shows this:

However, it should be noted that there may be a few types of very hard, dense papers, such as condenser tissue, very heavily calendered, "superdense" kraft paper, and possibly glassine, which may require grinding before extraction. Dr. Launer recommends that for hard, dense, or "specially thick," papers, the extraction be prolonged to 20 hours.

Cold extraction gave lower results (higher *p*H values) than hot extraction. This also agrees with Dr. Launer's findings.

Using the results of all laboratories as listed in Table I, the cold extraction results show the largest deviations between laboratories and a greater "maximum deviation from the average" for more papers than does the hot extraction. However, if the results for Laboratory 4 are omitted (because their results for hot extraction were not reported) then the "maximum deviations between laboratories" are larger in three cases and smaller in three other cases, for either type of extraction. The following tabulation shows this.

The large deviations from the averages and between laboratories renders evaluation of the test results difficult. It is to be noted that the results for the single paper containing glue (Sample 1014) were the most erratic. However, omitting Laboratory 4's results, it appears from the limited number of comparisons made that cold extraction (the proposed revised method) gave results of the same order of reproducibility that hot extraction did.

As only one laboratory was able to complete all of the tests originally contemplated, namely, both hot and cold extractions of both ground and unground paper, the results cannot be evaluated on the basis of a comparison of the present standard T 435 m with the proposed revision of that standard.

The large deviations from the averages and between laboratories for cold extraction test results and the possibility stated in the proposed revised method that hard, dense papers may require extraction times of as much as 20 hours suggests that the proposed revision may need amendment. If the paper-water mixture were well beaten, using a motor-driven stirrer, during the extraction, possibly more uniform results might result, and the extraction time for hard, dense, or thick papers might be so much reduced that

pH VALUE OF EXTRACTS

Sample:	999 Extract		1014 Extract		1137 Extract		1227 Extract		1236 Extract		1253 Extract	
	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot
Unground specimens, ave.*	6.35	6.42	5.57	5.15	5.66	4.83	5.61	4.88	5.84	5.26	5.97	5.01
Ground specimens, ave.**.	6.4	6.35	5.93	5.3	5.63	5.1	5.67	5.0	5.97	5.2	6.18	5.2
Difference	0.05	0.07	0.36	0.15	0.03	0.27	0.06	0.12	0.13	0.06	0.21	0.19

* Cold extracts, 6 laboratories; hot extracts, 5 laboratories
** Cold extracts, 3 laboratories; hot extracts, 1 laboratory

Sample:	999 Extract		1014 Extract		1137 Extract		1227 Extract		1236 Extract		1253 Extract	
	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot
Average, including Laboratory 4.....	6.35	6.42	5.57	5.15	5.66	4.83	5.61	4.88	5.84	5.26	5.97	5.01
Average excluding Laboratory 4.....	6.42	6.42	5.62	5.15	5.63	4.83	5.63	4.88	5.90	5.26	6.03	5.01
Max. deviation from ave. including Laboratory 4	0.35	0.30	0.73	0.45	0.19	0.22	0.34	0.24	0.46	0.41	0.43	0.41
Max. deviation from ave. excluding Laboratory 4	0.32	0.30	0.68	0.45	0.22	0.22	0.32	0.24	0.40	0.41	0.37	0.41
Max. deviation between laboratories, including Lab. 4.....	0.60	0.45	1.00	0.76	0.35	0.43	0.55	0.42	0.80	0.75	0.70	0.67
Max. deviation between laboratories excluding Lab. 4.....	0.50	0.47	0.90	0.76	0.35	0.43	0.55	0.42	0.60	0.75	0.60	0.67

grinding would not be necessary, which is very desirable.

The results of the pentosans test results are such that, if the results for Laboratory 7 are included, more study of the proposed method is needed. If Laboratory 7's results for Samples 1137 and 1236 are omitted, there is much better agreement as follows:

PENTOSANS, PERCENTAGE BY WEIGHT OF CELLULOSIC MATERIAL

Sample:	999	1014	1137	1227	1236	1253
Average	0.3	0.50	10.3*	4.2	14.4*	2.3
Max. dev. from ave.	0.1	0.1	0.4	0.55	0.5	0.8
Max. dev. between Labs.	0.2	0.2	0.7	1.5	0.8	1.3

* Omitting Lab. 7's results.

Conclusion

The lack of agreement between laboratories may be due to unfamiliarity with the method and not to its inherent faults. Three of the four laboratories had not determined pentosans before. It might be advisable to repeat the work on pentosans, with more laboratories taking part, if possible. The proposed method has the desirable properties of simplicity and speed, and should not be discarded because of lack of concordance of the extremely limited number of tests made.

Acknowledgment

The Subcommittee on Chemical Methods of TAPPI wishes to thank the laboratories who cooperated, namely: American Writing Paper Corp.; Electrical Testing Laboratories; John A. Manning Paper Co.; U. S. National Bureau of Standards; Skinner and Sherman, Inc.; S. D. Warren Co.; and U. S. Government Printing Office, Paper Testing Laboratory.

A Symposium on Spectrophotometry in the Pulp and Paper Industries

Introduction to Color of Pulp

(Continued from the issue of Sept. 12, 1940)

PAPERMAKER: Let's go back in the pulp mill. That's the logical place to start. (aside) I'd like to tell *him* a few things for a change.

METER: Yes, I agree that we ought to start with the raw material.

PAPERMAKER: And now, Mr. Meter, I have a surprise for you. I haven't matched colors for years. Lots of new stuff has been worked out since I had anything to do with it. So I have got some old friends of mine to bring us up to date. If we're going to start at the beginning with pulp, there couldn't be anybody better than Ray Hatch to do the job. Ray and I worked together in the mill years ago, and I know he's been a pulp man ever since in the Northwest.

METER: I've heard of Mr. Hatch. I know him as the first man to use a recording spectrophotometer in either the paper or the pulp industry.

PAPERMAKER: Yes, and he has continued his work with pulp ever since 1931. It's fortunate that we can hear him discuss the subject, "The Measurement of the Color of Pulps." R. S. Hatch:

The Measurement of Color of Pulps

By R. S. Hatch[1]

Abstract

The problem of evaluating the color of pulps is one which involves the exact physical measurement of the color rather than the expression of color value in psychological terms. The best instrument and the instrument to which all physical measurements of color should be referred is an automatic recording spectrophotometer. Under certain conditions, where pulp is being produced from a single species, an abridged spectrophotometer may be used for general research purposes, and a properly designed brightness meter may be used for manufacturing control. Brightness meters should be so constructed that commercial samples of the pulp itself can be directly measured without resorting to the making of special color sheets from the sample in question.

The processes involved in setting up standards for color in an article of commerce will depend largely upon the ultimate use to which the article will be put. It is a recognized fact that color may be considered from a strictly psychological viewpoint or from a strictly physical viewpoint. From a psychological viewpoint, the color of a material may be measured by its effect upon the consumer whether pleasing or displeasing, or it may be a desire on the part of the consumer to have a colored article which will harmonize with a specific set of surroundings or will match or harmonize with other articles or products in common use. In the case of paper, a particular mill may originate a series of colored papers which are particularly pleasing to their customers and which are well suited to the artistic effects desired in the production of advertising matter or other uses, where artistic effects are desirable. It is, of course, necessary for a mill producing such a series of colored papers to be able to match them with reasonable accuracy so that the ultimate consumer may be assured of a supply of a given color or colors, matching those which he has previously used. In almost all the cases cited, the effects produced are of a psychological nature. There may be cases, however, where a physical measurement of the color for a particular purpose may be desirable—e.g., the production of a background for fine color printing—but even in this case the effect may be considered more as a psychological

[1] Member TAPPI, Director of Research, Weyerhaeuser Timber Co., Longview, Wash.

effect than one resulting from purely physical considerations.

In paper we are dealing with a finished article of commerce which goes to the ultimate consumer. In the case of pulp we are dealing with something of a different nature. Pulp is a raw material which is further manufactured into the finished article of commerce, paper. For this reason the physical measurement of pulp color is probably of much more importance than its evaluation from a psychological point of view.

Before the advent of physical instruments capable of analyzing color, pulps, both bleached and unbleached, were sold on the basis of samples submitted and visual observation was for many years the only means of judging the color value of a pulp. The first step which was taken to standardize and numerically express the color of bleached pulp was the preparation of a set of standard color wheels made of plaster of paris to which varying amounts of pigments were added to simulate the different approaches to pure white ordinarily encountered in commercial pulps *(1)*. These wheels were mounted in a vertical plane, illuminated by a constant source of light and were so arranged that samples of the pulp in question could be placed on one or more of the disks and the whole system revolved at high speed while viewing the samples superimposed on the different disks. The particular disk with which the sample blended and became invisible against the background, determined the numerical color value of the pulp in question. This method set up a series of arbitrary standards and was subject to two main objections: (a) the impermanence of the disks themselves due either to changes in color of the pigments used or the darkening of the surface from outside causes, and (b) the personal factor of the operator.

The next refinement in the measurement of pulp colors was the use of some type of colorimeter in which 3 primary sources of colored light were reflected from a standard and the sample in question and the evaluation made by means of a split photometric field. This method also has the weakness of depending upon an individual operator and only by combining the results of several observers can anything approaching precise physical measurements be attained.

With the development of the photoelectric cell and suitable amplifying systems, it has been possible to construct an automatic recording spectrophotometer which is independent of individual observers and capable of completely analyzing any visible color. From the "Handbook of Colorimetry"*(2)* prepared under the direction of Arthur C. Hardy, I quote the following statement concerning a reflection factor curve produced by an automatic recording spectrophotometer as follows:

"Obviously, every possible color can be represented on a chart of this type. For example, a perfectly white surface, which reflects completely all the visible radiations that fall upon it, would be represented by a horizontal line at the top of the chart. Similarly, an absolutely black surface would be represented by a horizontal line at the bottom.

"The spectral reflection curve of a material constitutes a permanent record that does not require the maintenance of a sample of the color. Furthermore, the units in which the curve is expressed are understood and accepted in every civilized country. The wavelength of light has been adopted internationally as the fundamental standard of length to which all other standards of length are referred. The values of the reflection factor are referred to a white standard whose factor is 1.00 for all wavelengths. Such a standard is achieved by absolute methods of reflectometry."

Human Analysis of Color and Sound

Although a reflection factor curve is a physical measurement of any possible color, it is impossible to describe a color from observation of its reflection factor curve in such a manner that we possess a true mental picture of the color. It is a well known fact that the human ear is capable of analyzing sound to a high degree of perfection. The faculties of the perception of sound and color have both been coexistent since the origin of man, but the eye does not possess the ability to analyze color to the same degree as the ear possesses the ability to analyze sound. The reasons for these differences in degree of perception probably lie very deep in the protective and defensive mechanism of the human organism. Sounds are usually associated with motion or activity of some type and upon perceiving a sound, we instinctively turn our attention to its source and instinctively recognize whether or not the source of the sound may be of potential danger. The possible explanation of our more acute perception and analysis of sound as compared with color may be in the protective mechanism which has been built up in our evolutionary development. Because of our ability to analyze and classify sound through our auditory senses, we have built up a system of symbols of a purely physical nature, whereby the various manifestations of sound may be recorded with accuracy and universally understood by those with sufficient training to comprehend the significance of the established symbols. The trained musician has no difficulty in transforming the purely physical characters in the score of an opera or a symphony into psychological impressions.

Since the mechanism of human vision is incapable of analyzing and classifying colors, we have been compelled to resort largely to analogies in describing the sensations produced by color. We speak of leaf green, or rose red, or pearl gray, all of which terms are purely analogies that recall objects familiar to all of us but do not describe the colors in question in exact physical terms.

Attempts have been made to describe the variations in spectral colors by constructing a color sphere following the system recommended by Munsell. This method of color description is familiar to all who are interested in color designation and is covered very thoroughly in a recent report by Dean B. Judd and Kenneth L. Kelly*(3)*. While this system of color designation offers a means of designating color by descriptive process, it still depends upon a visual observation or comparison of a color with color charts which have been made up for purposes of comparison and from the point of view of purely physical measurement of the component parts of a color, the method is subject to variations in the visual perceptions of the observer, to the method of illumination, and the character of the surface observed.

Use of the Spectrophotometric Curve

In dealing with the color of a raw material which is to be further processed, it is most desirable for us to have a means of developing a spectrophotometric curve either with the aid of a recording spectrophotometer or an abridged spectrophotometer capable of showing us the reflection factors of a particular color in various parts of the spectrum. By the use of such an instrument, independent of idiosyncracies in the observer and producing a permanent record in mathematical terms, we are in a position to know beyond any question of doubt the true spectral properties of the substance under consideration and are able to say definitely how much it may differ from a given standard or what may be done to approach the standard more closely.

Unbleached sulphite pulps are finding considerable use today in mixtures with bleached pulp for many types of papers, and the measurement of color of unbleached pulps is consequently becoming of more importance than it has been in the past. If the papermaker desires to use an unbleached pulp of a given color as a foundation upon which to build the final color of the finished product, the most desirable foundation from which to start is a spectrophotometric curve which will enable him to determine just what effects can be produced with the pulp under consideration. A paper manufacturer who is buying pulp from various sources and wishes to use them interchangeably should have spectrophotometric curves which would show him the color characteristics of the pulps from the various sources. On the other hand, experience has shown that pulp being made by a single mill from a single wood species shows comparatively small variations throughout the reflection factor curve and consequently any day to day variations may be adequately measured by some type of abridged spectrophotometer or a brightness meter adjusted to the most sensitive part of the reflection factor curve. Since 1933, the brightness meter has come into general use in the pulp and paper industries as an instrument for the measurement and control of color. With the modern brightness meter and a suitable series of color filters, it is possible to draw a reflection factor curve which, while not accurate in all regions of the spectrum, may be close enough for comparative purposes provided experience has shown that variations do not occur in those portions of the reflection factor curve where sensitivity is lacking. In research work where the color of unbleached pulps is involved, the only instrument which will give fully reliable information throughout the entire spectrum is, of course, the recording spectrophotometer. If such an instrument is not available to the research worker, then reflection factor curves developed by an abridged spectrophotometer should be checked against a recording spectrophotometer at frequent intervals.

The characteristic spectrophotometric curve of unbleached sulphite pulp shows a low reflection factor at the blue end of the spectrum with a very definite increase in reflection factor as the red end of the spectrum is approached. Curves of pulps made from the same species of wood will, in general, be nearly parallel to each other, so a complete curve may be higher or lower in total reflection factor but have substantially the same slope. If, however, we compare pulps made from different species of wood, we find that the slope of the reflection factor curve may vary considerably, depending upon the species of wood used as a raw material. It is a comparatively easy matter to pick some wavelength band which will be a measure of color variation in pulp from one species. This enables us to use a brightness meter for control or study of pulps in a mill, where a standardized pulp is produced from a single species. If, however, we wish to compare pulps made from different species of wood, we must resort to spectrophotometric curves to make intelligent comparisons.

One of the drawbacks to the use of photoelectric instruments for the measurement of color is the presence of foreign matter such as specks of dirt or shives in the sample under examination. When a sample containing a small speck of dirt—e.g., carbon—is placed in the field of a sensitive spectrophotometer, the effect of this speck is, of course, to lower the entire curve. If, on the other hand, a speck of dirt is made up of a red shive as so frequently occurs in unbleached pulp, the effect will not only be to lower the entire curve but also to change its slope on account of the distinct red color of the shive. It is, therefore, necessary to examine samples with great care before color readings are made, since the dirt component should not be taken into consideration when evaluating color. For certain types of instruments, the surface of the sample is of particular importance, and this will be mentioned when discussing the measurement of the color of bleached pulp.

Measurement of Pulp Color

The manufacturer of bleached pulp endeavors in the bleaching process to remove, as completely as possible, all material of a colored nature and produce a finished product approaching, as nearly as possible, a pure white. While the manufacturer endeavors to produce as pure a white as possible, he is to some extent limited in his bleaching process to a treatment which will not be so severe as materially to lower the physical and chemical properties of the finished product. The result is that the bleaching operation is more or less a compromise, in which some sacrifices must be made to color on the one hand and to physical properties on the other hand. Long experience in the observation of reflection factor curves of bleached pulp shows that the main variations are in the blue end of the spectrum and for that reason brightness meters are coming into general use as control instruments in the manufacture of bleached pulp. The brightness meters most commonly used today give a reflection factor value for a wave band close to 458 mμ. This instrument serves very well as a control instrument provided certain precautions in the selection of the sample for surface and dirt are observed. In the measurement of color of bleached pulps dirt, of course, plays as important a role as in unbleached pulp. Systems have been developed for measuring the amount of dirt in a sample of bleached pulp; but in the measuring of color, we should consider the color value of the mass of fibers alone and leave out of consideration any foreign matter which may be present.

While a wave band in the vicinity of 458 mμ has been generally accepted as a point for the measurement of the reflection factor of bleached pulps, the figure obtained by this measurement is by no means the whole story, because different bleaching agents and methods may have important effects in other regions of the spectrum. It is reasonably safe to assume, however, that for a given species of pulp and a given bleaching method the reflection factor curves will be roughly parallel, and a measurement at one point will be sufficiently accurate for control. For research purposes, however, where different methods of bleaching and different bleaching agents are being investigated, the only accurate information which can be obtained is that which a complete spectrophotometric curve will reveal.

At the present time, automatic recording spectrophotometers are expensive instruments. They may be easily damaged by unskilled operators, and the interpretation of the results must be left to those who have sufficient training to evaluate them correctly. On the other hand, brightness meters are comparatively inexpensive, and if periodically standardized against a recording spectrophotometer they serve very well indeed as a control instrument. They are relatively simple to operate and are sufficiently rugged for general use.

effect than one resulting from purely physical considerations.

In paper we are dealing with a finished article of commerce which goes to the ultimate consumer. In the case of pulp we are dealing with something of a different nature. Pulp is a raw material which is further manufactured into the finished article of commerce, paper. For this reason the physical measurement of pulp color is probably of much more importance than its evaluation from a psychological point of view.

Before the advent of physical instruments capable of analyzing color, pulps, both bleached and unbleached, were sold on the basis of samples submitted and visual observation was for many years the only means of judging the color value of a pulp. The first step which was taken to standardize and numerically express the color of bleached pulp was the preparation of a set of standard color wheels made of plaster of paris to which varying amounts of pigments were added to simulate the different approaches to pure white ordinarily encountered in commercial pulps *(1)*. These wheels were mounted in a vertical plane, illuminated by a constant source of light and were so arranged that samples of the pulp in question could be placed on one or more of the disks and the whole system revolved at high speed while viewing the samples superimposed on the different disks. The particular disk with which the sample blended and became invisible against the background, determined the numerical color value of the pulp in question. This method set up a series of arbitrary standards and was subject to two main objections: (a) the impermanence of the disks themselves due either to changes in color of the pigments used or the darkening of the surface from outside causes, and (b) the personal factor of the operator.

The next refinement in the measurement of pulp colors was the use of some type of colorimeter in which 3 primary sources of colored light were reflected from a standard and the sample in question and the evaluation made by means of a split photometric field. This method also has the weakness of depending upon an individual operator and only by combining the results of several observers can anything approaching precise physical measurements be attained.

With the development of the photoelectric cell and suitable amplifying systems, it has been possible to construct an automatic recording spectrophotometer which is independent of individual observers and capable of completely analyzing any visible color. From the "Handbook of Colorimetry"*(2)* prepared under the direction of Arthur C. Hardy, I quote the following statement concerning a reflection factor curve produced by an automatic recording spectrophotometer as follows:

"Obviously, every possible color can be represented on a chart of this type. For example, a perfectly white surface, which reflects completely all the visible radiations that fall upon it, would be represented by a horizontal line at the top of the chart. Similarly, an absolutely black surface would be represented by a horizontal line at the bottom.

"The spectral reflection curve of a material constitutes a permanent record that does not require the maintenance of a sample of the color. Furthermore, the units in which the curve is expressed are understood and accepted in every civilized country. The wavelength of light has been adopted internationally as the fundamental standard of length to which all other standards of length are referred. The values of the reflection factor are referred to a white standard whose factor is 1.00 for all wavelengths. Such a standard is achieved by absolute methods of reflectometry."

Human Analysis of Color and Sound

Although a reflection factor curve is a physical measurement of any possible color, it is impossible to describe a color from observation of its reflection factor curve in such a manner that we possess a true mental picture of the color. It is a well known fact that the human ear is capable of analyzing sound to a high degree of perfection. The faculties of the perception of sound and color have both been coexistent since the origin of man, but the eye does not possess the ability to analyze color to the same degree as the ear possesses the ability to analyze sound. The reasons for these differences in degree of perception probably lie very deep in the protective and defensive mechanism of the human organism. Sounds are usually associated with motion or activity of some type and upon perceiving a sound, we instinctively turn our attention to its source and instinctively recognize whether or not the source of the sound may be of potential danger. The possible explanation of our more acute perception and analysis of sound as compared with color may be in the protective mechanism which has been built up in our evolutionary development. Because of our ability to analyze and classify sound through our auditory senses, we have built up a system of symbols of a purely physical nature, whereby the various manifestations of sound may be recorded with accuracy and universally understood by those with sufficient training to comprehend the significance of the established symbols. The trained musician has no difficulty in transforming the purely physical characters in the score of an opera or a symphony into psychological impressions.

Since the mechanism of human vision is incapable of analyzing and classifying colors, we have been compelled to resort largely to analogies in describing the sensations produced by color. We speak of leaf green, or rose red, or pearl gray, all of which terms are purely analogies that recall objects familiar to all of us but do not describe the colors in question in exact physical terms.

Attempts have been made to describe the variations in spectral colors by constructing a color sphere following the system recommended by Munsell. This method of color description is familiar to all who are interested in color designation and is covered very thoroughly in a recent report by Dean B. Judd and Kenneth L. Kelly*(3)*. While this system of color designation offers a means of designating color by descriptive process, it still depends upon a visual observation or comparison of a color with color charts which have been made up for purposes of comparison and from the point of view of purely physical measurement of the component parts of a color, the method is subject to variations in the visual perceptions of the observer, to the method of illumination, and the character of the surface observed.

Use of the Spectrophotometric Curve

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The brightness meters most generally used in the pulp industry today must use a sample having a relatively smooth and flat surface. This necessitates the making of a sheet of paper under standard conditions from the sample under consideration. Standard conditions have been developed for the making of such color sheets, but any handling of fiber as in the making of color sheets is likely to introduce foreign matter which may seriously affect the color reading. Modern spectrophotometers are constructed either with integrating spheres or with diffuse illumination so that surface effects are eliminated. A decided improvement in brightness meters would be an arrangement of the illuminating system which would do away entirely with surface effects which in many cases have a profound effect upon color readings made with instruments at present available.

When dealing with pulps which have been highly bleached, it is obvious that we should handle the sample as little as possible, if we wish to obtain a true reading of the color value. This fact should be given due consideration by the manufacturers of brightness meters and they should be so constructed that samples of sheeted bleached pulp will show the same reflection factor reading regardless of the way the sample is placed on the viewing aperture. This is not true at the present time. It could be remedied by incorporating an integrating sphere or by using a system of diffuse illumination of the sample with vertical scanning by the photocell.

Conclusion

It is hoped that as time goes on sufficient demand for automatic recording spectrophotometers will arise to stimulate the manufacturers to lower the cost and still further improve the construction of these instruments, so that they will come into more universal use and that the public in general will come to recognize in a spectrophotometric curve the precise measurement of color.

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(1) Manufacture of pulp and paper, New York, McGraw-Hill vol. 3, 3rd ed., sec. 8 (1937). p. 34.
(2) Handbook of colorimetry, Prepared by the staff of The Color Measurement Laboratory, Massachusetts Institute of Technology, under the direction of Arthur C. Hardy, The Technology Press (1936).
(3) Judd, Deane B., and Kelly, Kenneth L. Method of designating colors Natl. Bur. Standards, Research Paper RP1239 (Sept., 1939).

(To be continued)

TAPPI Notes

About ten members of TAPPI joined a cruise to Alaska following the fall meeting of the Association at Seattle. Clark C. Heritage has written that this post-convention trip was delightful.

Correction to TAPPI Standard E 2 p-40 Flow Measurements of White Waters and Wastes. The equation in Fig. 3 should read $V = q/450A$.

Reprints of the Index to Vol. 110 (Technical Section, *Paper Trade Journal)* may be obtained from the secretary of the Technical Association, 122 East 42nd Street, New York, N. Y.

Bror E. Anderson, formerly American Creosoting Company fellow, University of Minnesota is now in the Filter Products Research Department, Johnson & Johnson, New Brunswick, N. J.

John W. Bard, formerly of the Institute of Paper Chemistry is now chemical engineer with the Marathon Paper Mills, Rothschild, Wis.

C. A. Blodgett, formerly superintendent of the A. P. W. Paper Company is now chemical engineer with the American Molasses Company, 120 Wall street, New York.

J. C. Bletzinger, formerly of the Institute of Paper Chemistry is now chief chemist of the Sterling Pulp and Paper Company, Eau Claire, Wis.

D. E. Cousins, formerly of the Champion Paper and Fibre Company is now mill manager of the Hollingsworth & Whitney Company, Mobile, Ala.

Cyrus H. Heigl, formerly of the Scott Paper Company is now development engineer for the John Nielsen Engineering Company, South Beloit, Ill.

Harry A. Hughes, Jr., formerly of the Bates Valve Bag Company, New Orleans, La., is now in the machine shop division of the St. Regis Paper Company, Oswego, N. Y.

E. F. Hinner has been transferred from the Hercules Powder Company, Hopewell, Va., to the Virginia Cellulose Division, Wilmington, Del.

E. R. Lang, formerly of Ault & Wiborg, Cincinnati, Ohio, is now research chemist for the Hall Laboratories, Pittsburgh, Pa.

W. H. Kraske, formerly of the Anglo-Newfoundland Development Company, is now sulphite mill superintendent of the Sterling Pulp and Paper Company, Eau Claire, Wis.

Edwin P. Jones, formerly of the Ecusta Paper Company, is now technical director of the Ancram Paper Mills, Ancram, N. Y.

Harold A. Kline, formerly of the New York and Pennsylvania Company, is now junior chemist with the U. S. Chemical Warfare Service, Edgewood Arsenal, Md.

H. A. Kaufmann has been transferred to the New York office of the American Maize Products Company, 100 East 42nd street.

F. C. Ladd, formerly superintendent of the Keith Paper Company, is now with the American Writing Paper Company, Holyoke, Mass.

Kon Matchuk, formerly of the New York State College of Forestry, is now a research chemist for the Kimberly-Clark Corporation, Kimberly, Wis.

Fletcher Paper Co. Closes

The Fletcher Paper Company, Alpena, Mich., after 55 years of almost continuous operation, according to the *Detroit Free Press* announced Friday that it was suspending operations for an indefinite period "due to economic conditions over which it has no control."

Company officials said that the price of domestic wood pulp had skyrocketed to the point where finished paper sold for little more than the actual cost of pulp. They said that importing of pulp from Scandinavian countries had fallen off heavily since the outbreak of the war.

For the present, dismantling of the plant was not contemplated.

The Alpena plant was one of the oldest in the nation. It was founded in 1886 by George N. Fletcher, grandfather of Harry E. Fletcher, vice president and general manager, starting as a sulphite mill and expanding in 1898 to include the present paper mill.

At its peak the firm employed 240 men. One hundred fifty were on the payroll when closing was ordered.

Chlorite *vs.* Hypochlorite for Bleaching*

By J. F. White[1] and G. P. Vincent[2]

Abstract

Hypochlorite is not entirely satisfactory for bleaching wood pulp, because, being a strong oxidizing agent, it will attack wood pulp unless used under carefully controlled conditions. Sodium chlorite is proposed as a supplement to hypochlorite, because, though it can oxidize the coloring matter of cellulose, it is not powerful enough to seriously damage cellulose itself. Hence, wood pulp can be bleached to a high brightness with chlorite without loss of fiber strength, and the process does not require careful control.

With chlorite bleaching, it was found that there was no lowering of either the cuprammonium viscosity or the alpha-cellulose content of the original pulp, whereas both of these values were lowered by hypochlorite bleaching.

Proper chemical and physical conditions for bleaching wood pulp with chlorite are discussed.

The use of hypochlorite for bleaching wood pulp has not been entirely satisfactory. It is a strong oxidizing agent which can attack the cellulose. This undesired reaction becomes more difficult to control as the wood pulp is more completely bleached. There have been many changes suggested for overcoming the difficulties and satisfying the continual demand for whiter bleached pulps with high strength. But with each step of advance control becomes more difficult.

An entirely new bleaching process is needed. Sodium chlorite has recently been proposed as a bleaching agent for wood pulp *(1)*. It oxidizes the colored bodies present in the wood pulp without possessing sufficient power to seriously damage the cellulose. It is specially valuable in difficult problems such as the final stage in bleaching sulphate pulps to high brightness without loss of strength. Sodium chlorite can form chlorine dioxide, but never chlorine *(2)*, so that its possible reactions differ greatly from those of hypochlorite.

When suggesting a new bleaching agent with such definitely different reactions, comparison with the well-known bleaching processes is necessary. There are no definite standard conditions for bleaching wood pulp with hypochlorite. The optimum conditions for the bleaching stage depend upon the species of wood, the cooking process, and all the preceding stages of bleaching.

Several mills are reported to be bleaching sulphate pulp to a brightness of 75 to 80 as measured on the reflection meter without serious damage to the other properties of the pulp. Sodium chlorite can be used to bleach a pulp to a still higher brightness without loss of strength *(1)*. The problem in the comparison between the use of chlorite and hypochlorite is largely the question whether hypochlorite can be made to duplicate these results. This was attempted on a laboratory scale. The pulp used was a bleached sulphate pulp made in the south which was secured through commercial channels. Its brightness as received was about 80. Because it was not a special sample secured directly from the mill which produced it, the strength loss during commercial bleaching is unknown.

Experimental Methods

Several laps of this pulp were simultaneously disintegrated and centrifuged. Portions of 125 grams, moisture-free, were bleached in enameled pails. The temperature was maintained by setting the pails in a water bath. Previous experiments had suggested that some buffers might affect the properties of the bleached pulp so that only hydrochloric acid and sodium hydroxide were used to adjust the pH. The solutions were checked at intervals during bleaching by use of a glass electrode pH tester. If the pH had changed greatly, it was corrected by the addition of the appropriate chemical.

The samples were milled in an Abbé ball mill and sheeted with Williams apparatus. Before testing the sheets were hung at least overnight in the constant temperature-constant humidity room maintained at 70 deg. F. and 50% relative humidity. The tests were made upon a Perkins burst (Mullen) tester and Elmendorf tear tester. The results were calculated to 40 pounds basis weight (24 x 36 — 480). The freeness of a one-gram sample was determined in a Williams precision freeness tester with attached electric clock. The tearing resistance was calculated for 70 seconds freeness. This value was selected as it approximated the freeness at the maximum bursting strength.

The brightness was determined with a General Electric reflection meter. The tabs used in this determination were placed in envelopes and stored in the constant temperature-constant humidity room. The stability of brightness could thus be determined on the same tabs that had been used initially.

Basis of Comparison

Brightness, maximum bursting strength and tearing resistance have been used to evaluate the bleaching methods. The differences between values for the properties of two samples of pulp bleached in diverse ways may be less than between duplicate determinations upon the same pulp. Conclusions based upon a single comparison between experiments are therefore unsound. Repetition of results is necessary to establish a basis for valid conclusions.

Confirmation of the effect of the conditions of bleaching was obtained by varying one condition under different groupings of the other conditions. It is advantageous to extend these series to extreme conditions in order to magnify the effects produced. Graphical representation of the data showed good agreement concerning the relative effect of the various individual conditions upon brightness. The maximum bursting strength exhibited less regularity. Yet these data sufficed to permit the selection of the optimum practical conditions for bleaching.

Comparison of entirely different bleaching processes requires the establishment of the numerical magnitude of the properties of the resulting pulps. Using selected groupings of conditions the results of

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[2] Research and Development Department, Mathieson Alkali Works, Inc., New York, N. Y.

duplicate experiments were averaged. The significance of the differences between these averages depends upon their precision. This is measured by the average deviation from the mean (a.d.) which is "a numerical measure of the amount by which a new observation is likely to differ from the mean value *(3)*." This variation is equally likely to be plus or minus.

The data for brightness agree so well that their evaluation was relatively easy. The main problem concerned the determination of what should be considered as a significant change in the maximum bursting strength. This had been determined 25 times upon the untreated pulp. The results averaged 51.5 with 1.6 as the average deviation from the mean. Thus individual determinations of the bursting strength of bleached samples between 49.9 and 53.1 may indicate no change.

Tearing resistance cannot be evaluated as precisely. These experiments extended over two periods of several months each about a year apart. During this time there was a decrease in the number of revolutions of the ball mill necessary to produce a given freeness and to develop the maximum bursting strength. The numerical values for tearing resistance at uniform values of freeness may therefore not be strictly comparable. Conclusions regarding tearing resistance must be based upon general trends rather than definite numerical differences. The average tearing resistance for the original pulp at 70 seconds freeness was 47.5.

Bleaching with Hypochlorite

The literature concerning the use of hypochlorite for bleaching wood pulp agrees only in general details. Pulps react differently to variations in some of the conditions of bleaching so that experiments are necessary to select the best conditions for using hypochlorite. As laboratory results are generally better than those currently obtained in commercial operation, the selection of the best laboratory processs for bleaching with hypochlorite establishes the limits of probable future commercial developments. Any bleaching agent producing results superior to these is not likely to be supplanted by improvements in the bleaching with hypochlorite.

Variations in temperature appear uniform in their effects upon all wood pulps bleached with hypochlorite. The customary maximum temperature is 100 deg. F. (38 deg. C.). As the heating baths were only manually controlled, there was some variation

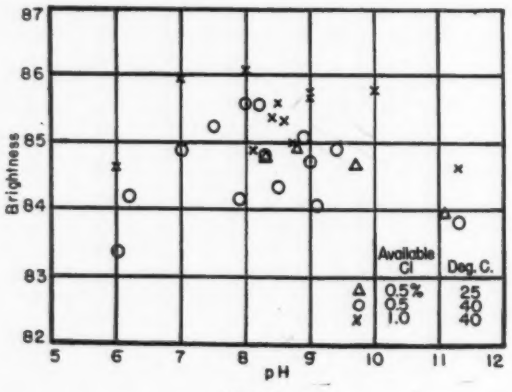

FIG. 1
Brightness of Hypochlorite Bleached Pulp

TABLE I.—pH AND TEMPERATURE IN HYPOCHLORITE BLEACHING

5% Consistence; 2 hours, unless exhausted sooner

	pH	Brightness	Brightness One-Year Loss	Maximum Bursting Strength	Tear at 70 Seconds Freeness
(Temperature at 25 deg. C., and 0.5% available chlorine)					
1068- 55	8.3	84.77	4.51	49.7	44.1
- 56	8.8	84.90	4.36	48.5	47.4
- 57	9.7	84.66	3.52	50.2	44.6
- 58	11.1	83.97	3.05	49.1	46.8
(Temperature at 40 deg. C., and 0.5% available chlorine)					
-239	6.0	83.37	6.03	49.3	45.6
- 83	6.2	84.19	6.98	47.4	40.9
-240	7.0	84.88	7.04	50.2	44.9
- 84	7.5	85.24	4.55	49.7	44.9
- 29	7.9	84.16	5.79	49.2	(45)
-213	8.0	85.58	4.86	49.7	43.6
- 2	8.2	85.55	5.79	49.0	(41)
-245	8.3	84.81	4.83	52.5	45.0
- 30	8.5	84.34	5.29	49.4	(44)
-122	8.9	85.09	2.58	50.2	47.3
-246	9.0	84.70	4.13	54.0	45.8
Ave. pH 8-9		85.01	4.58	50.8	45.4
a.d.		0.40	0.82	1.6	1.1
-320	9.1	84.06	2.66	48.2	43.3
- 31	9.4	84.90	4.52	49.8	(42)
- 32	11.3	83.83	1.60	50.3	(46)
(Temperature at 40 deg. C., and 1.0% available chlorine)					
-243	6.0	84.64	13.26	42.2	33.5
-215	8.0	86.07	5.75	50.5	42.0
-244	7.0	85.94	10.96	46.1	34.2
- 37	8.1	84.88	6.20	45.2	(38)
-247	8.4	85.36	5.55	49.4	44.0
-283	8.5	85.59	4.07	50.3	47.4
- 38	8.6	85.34	4.99	47.3	43.0
-314	8.7	84.97	4.17	50.6	39.3
-114	9.0	85.73	3.11	47.0	46.1
-248	9.0	85.67	3.90	51.7	44.1
Ave. pH 8-9		85.45	4.72	49.0	43.7
a.d.		0.31	0.91	1.9	1.9
- 39	10.0	85.77	4.02	47.1	39.5
- 40	11.3	84.63	1.64	46.6	43.9

Numbers in parentheses indicate freeness of first portion was above 70.

in temperature. Table 1 shows that the results obtained at 40 deg C. (104 deg. F.) were no worse, and possibly were a little better, than at 25 deg. C. (77 deg. F.). This indicates that the control of temperature was sufficiently accurate.

High consistence during bleaching is supposed to induce hydration through the rubbing of one fiber upon another. Similar results are obtained when the pulp is bleached without stirring. It may be that these undesirable effects are caused by the hypochlorite. Therefore 5% consistence was used in all studies concerning the effects of the other conditions of bleaching.

The recent literature of hypochlorite bleaching has given great prominence to the effect of too low a pH. This does not establish the optimum pH for use when bleaching any specified pulp. Since buffers were not used the pH of these bleaching experiments changed and had to be corrected by the addition of the proper chemicals. To simplify the presentation of the data a single value of pH was selected by inspection. Greatest weight was given to the determinations of pH when the concentration of hypochlorite was highest.

The lower limit recommended for hypochlorite bleaching is usually pH 8 *(4, 5, 6)*. To show the effect of pH over the whole of the important range, all of the experiments are shown in Table I in which the weighted average pH was 6 or higher, and the other conditions were as designated.

The experiments are most numerous at pH 8 to 9. These two values were selected for use when studying the effect of variations in the other conditions of bleaching. As no buffers were used, the weighted average values for pH are scattered over this range. The data indicate that this was the optimum range of pH. The brightness at 40 deg. C. when 1% available chlorine was used is the only average which would be higher if a wider range of pH were included.

The results are more easily visualized in graphic

form. Figure 1 shows that the brightest pulps were produced by bleaching at pH 8 to 9. Figure 2 shows that there is no regularity in the maximum bursting strengths. Only one value exceeds 53.1 which is the highest probable value for an individual determination on the original pulp. Most of the values lie below 49.9 which is the corresponding lowest probable value. Some damage to the pulp is indicated.

Tearing resistance and the loss of brightness at pH 8 to 9 well represent the data shown in Table I. The least change in brightness of hypochlorite bleached pulps was found when pH 11 had been used. Yet the loss in brightness at pH 8 to 9 is not great enough to destroy the pre-eminence of this range, when all the properties of the pulps are taken into consideration.

Since it was not required that the hypochlorite be exhausted, time and the quantity of available chlorine could be separately varied. Excess of either could produce overbleaching. These effects are recognized so that it was only necessary to determine the proper values for use in bleaching this pulp. As average values are not available for all the conditions, selection will have to be based upon duplication of the general trends.

The data in Table II show that two hours may be somewhat of a compromise in that a longer time produces higher brightness while damaging the strength to a greater extent. Under less favorable bleaching conditions one hour was insufficient. The loss in bursting strength for two hours bleaching time in these and other laboratory experiments approximated that reported to be the best plant results using hypochlorite. Therefore this was adopted as the standard time for laboratory bleaching experiments.

Table III shows the effect of varying concentrations of available chlorine. Small amounts of available chlorine do not produce a high enough brightness to be considered representative of the best which can be obtained by hypochlorite bleaching. It is evident that 2% available chlorine is sufficient to seriously damage the strength of the pulp. For these reasons, 0.5% and 1% were selected for use in these comparisons.

This study of the bleaching of a sulphate pulp has

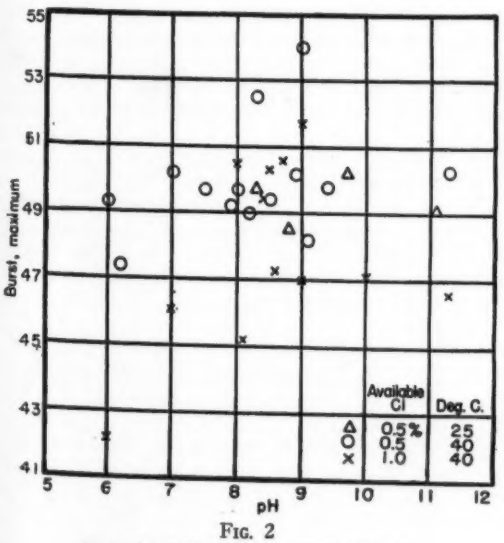

FIG. 2
Strength of Hypochlorite Bleached Pulp

TABLE II.—TIME OF HYPOCHLORITE BLEACHING
5% Consistence; 40 deg. C.

	Time hours	pH	Brightness	Brightness One-Year Loss	Maximum Bursting Strength	Tear at 70 Seconds Freeness
		(0.5% Available Chlorine)				
1068- 1	1	8.2	84.69	5.13	51.0	(48)
-120	1	9.0	85.16	4.28	49.8	48.5
Ave.	2	8-9	85.01	4.58	50.8	45.4
-214	3	8.0	86.01	5.10	47.5	42.7
		(1.0% Available Chlorine)				
-112	1	8.8	85.05	3.03	48.9	48.0
Ave.	2	8-9	85.45	4.72	49.0	43.7
-216	3	8.0	86.37	8.90	44.5	38.0

Numbers in parentheses indicate freeness of first portion was above 70.

resulted in the selection of the following conditions as being optimum for the use of hypochlorite: 5% consistence; pH 8 to 9; 40 deg. C. (104 deg. F.); two hours; and 0.5 and 1% available chlorine.

Chlorite Bleaching

The direct substitution of chlorite for hypochlorite in bleaching has produced unsatisfactory results. The discovery of the proper conditions under which to use chlorite opened an entirely new field in the bleaching of cellulosic materials. Changes in the conditions of bleaching have different effects than when hypo-

TABLE III.—AVAILABLE Cl_2 IN HYPOCHLORITE BLEACHING
5% Consistence; 2 hours; 40 deg. C.

	pH	Brightness	Brightness One-Year Loss	Maximum Bursting Strength	Tear at 70 Seconds Freeness
		(0.2% Available Chlorine)			
1068- 51	8.1	84.57	3.89	47.7	44.3
- 52	8.9	84.82	3.79	48.3	46.8
		(0.5% Available Chlorine)			
Ave.	8-9	85.01	4.58	50.8	45.4
		(1.0% Available Chlorine)			
Ave.	8-9	85.45	4.72	49.0	43.7
		(2.0% Available Chlorine)			
-250	8.2	87.12	9.01	43.1	37.8
-251	8.6	86.86	7.02	46.3	37.8

chlorite is used. The best results are obtained by bleaching in an acid medium at high temperature.

Representative conditions for bleaching with chlorite were selected after experimental study. They are: 5% consistence; pH 4.5 to 5.5; 80 deg. C. (176 deg. F.); two hours; and 0.5 and 1% available chlorine.

The consistence was arbitrarily set at 5% for direct comparison with the best results obtained by the use of hypochlorite.

The results of all of the experiments using chlorite under the above conditions are shown in Table IV. The poorest individual results with chlorite and the best with hypochlorite overlap. Consideration of the groups as a whole shows that bleaching with

TABLE IV.—CHLORITE BLEACHING
5% Consistence; 2-hours; 80 deg. C.

	pH	Brightness	Brightness One-Year Loss	Maximum Bursting Strength	Tear at 70 Seconds Freeness
		(0.5% Available Chlorine)			
1068- 18	4.7	85.46	3.21	52.2	(48)
- 98	5.4	84.82	3.00	52.0	50.0
-183	4.9	85.71	2.27	51.6	44.7
-382	5.1	85.37	2.15	55.4	45.8
-472	5.4	85.07	...	52.0	40.2
Ave.		85.29	2.66	52.6	45.2
a.d.		0.27	0.45	1.1	2.7
		(1.0% Available Chlorine)			
1068- 20	5.3	85.77	2.85	49.4	(46)
-100	5.5	85.86	1.91	48.4	50.3
-126	5.2	85.39	2.45	50.0	49.2
-129	5.0	84.60	1.80	52.0	48.5
-184	5.0	85.93	1.79	52.4	49.0
-383	5.1	85.89	1.73	54.0	47.0
-430	5.1	85.91	...	51.4	46.4
Ave.		85.62	2.09	51.1	48.4
a.d.		0.36	0.38	1.6	1.1

Numbers in parentheses indicate freeness of first portion was above 70.

chlorite is superior. Such comparison may be made by means of the average values. These are given in Table V together with the corresponding values for the untreated pulp.

When the same quantities of available chlorine were used as chlorite and hypochlorite, the resulting brightnesses were essentially equal, the samples bleached with chlorite being very slightly the higher. When stored for over a year, the loss of brightness in the samples bleached with chlorite was small so that they were then two units higher in brightness than those bleached with hypochlorite.

The averages for maximum bursting strength and tearing resistance are, with one exception, higher for the samples bleached with chlorite. One very low result for the tearing resistance resulting from the use of 0.5% available chlorine as chlorite makes this average very slightly smaller than the corresponding one for hypochlorite. The samples bleached with chlorite possess about the same strength as the untreated pulp. Those bleached with hypochlorite are

TABLE V.—COMPARISONS OF AVERAGE VALUES

	Brightness	Brightness One-Year Loss	Maximum Bursting Strength	Tear at 70 Seconds Freeness
	5% Consistence; 2 hours			
Chlorite—pH 4.5-5.5; 80 deg. C.				
	(0.5% Available Chlorine)			
Ave.	85.29	2.66	52.6	45.2
a.d.	0.27	0.45	1.1	2.7
	(1.0% Available Chlorine)			
Ave.	85.62	2.09	51.1	48.4
a.d.	0.36	0.38	1.6	1.1
Hypochlorite—pH 8.0-9.0; 40 deg. C.				
	(0.5% Available Chlorine)			
Ave.	85.01	4.58	50.8	45.4
a.d.	0.40	0.82	1.6	1.1
	(1.0% Available Chlorine)			
Ave.	85.45	4.72	49.0	43.7
a.d.	.31	.91	1.9	1.9
Original				
Ave.	79.35	1.85	51.5	47.5
a.d.	0.60	...	1.6	2.8
Number of tests	5	1	25	25

weaker. The precision of these averages, as shown by the average deviation from the mean is about the same. These groups of experiments indicate that the samples bleached with chlorite were better than those bleached with hypochlorite, while other experiments indicate that chlorite can be used to produce still better pulps.

Although hypochlorite has been in use for years as a bleaching agent, improvements are still being suggested. Similar devlopments are to be expected with chlorite as experience accumulates. These may involve changes in cooking and the preliminary stages of bleaching, or in the actual bleaching with chlorite. This present series of experiments can only yield information concerning the latter possibility.

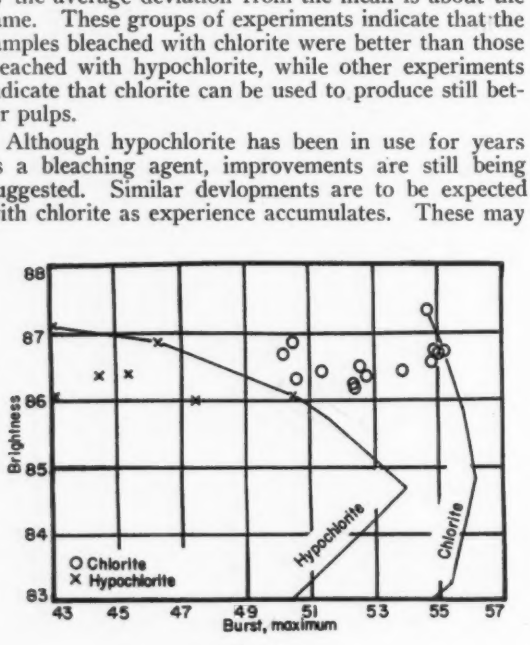

FIG. 3
Effect of Bleaching Agents.

The data for maximum bursting strength and brightness are most suitable for use in attempting to visualize the results of future developments. Among the experiments there are some of very high quality. It is logical to assume that future experience will increase the proportion of good results. The average of duplicate bleaches would then approach the best individual values of the present experiments. Comparison of the very best results obtained by the use of chlorite and hypochlorite will establish the probable limits to such improvement in the properties of the bleached pulp.

The experiments having the highest maximum bursting strength for each brightness were selected from all the data. The solid lines in Fig. 3 connect points representing the best of these. These lines show an increase in the maximum bursting strength until a brightness of about 85 is produced by the bleaching. At higher values for brightness hypochlorite bleaching causes the maximum bursting strength to decrease rapidly with increases in brightness. But when chlorite is used, the maximum bursting strength is almost constant. Chlorite bleaching can be superior to hypochlorite at all brightnesses, and specially so at the highest values.

These lines were based upon individual experiments. Taken as a whole the data also indicate that chlorite bleaching produces higher values for maximum bursting strength than hypochlorite. The experiments were planned to study the effect of conditions. About the same proportion of experiments used extreme conditions for both chlorite and hypochlorite. The resulting maximum bursting strengths can therefore be compared on the basis of their statistical distribution.

The average value of 25 determinations of maximum bursting strength on the untreated pulp was 51.5. Of these, 12 were above the average which is an equal distribution, such as would be predicted from the theory of errors. Hypochlorite was used to bleach 63 samples. Of these only 5 samples, or 8%, showed a bursting strength as high or higher than the average for the untreated pulp. This would again indicate that the treatment with hypochlorite had lowered the bursting strength of the pulp. The experiments using hypochlorite under the best conditions are shown in Table I. Of the samples bleached with 0.5% available chlorine as hypochlorite only two have values for the maximum bursting strength higher than the average for the untreated pulp. Only one of the eight samples bleached with 1% available chlorine was above the average. The total of these groups was three out of 14, or 21%, which is a confirmation of their representing the best use of hypochlorite.

Chlorite was used to bleach 259 samples of which 166, or 64%, showed a bursting strength of 51.5 or higher. Table IV gives the data for the experiments selected to represent chlorite bleaching in the comparison of averages. All five of the samples treated with 0.5% available chlorine as chlorite and three of seven treated with 1%, showed maximum bursting strengths equal to or greater than that of the untreated pulp. Two thirds of the samples in these groups were definitely as good as or better than the

untreated pulp. Thus, both the total number of experiments and the group selected for the comparisons show about the same large percentage of high values for the maximum bursting strength. It is evident that proper bleaching with chlorite will not lower the bursting strength of the pulp.

All the samples which were bleached to a brightness of 86, or higher, are shown in Fig. 3. Lower values are excluded because there are too many experiments for clear presentation. At these high brightnesses none of the samples bleached with chlorite have a maximum bursting strength below 49.9, the lowest probable value for the untreated pulp. Six of the 14 are above 53.1 which is the highest value to be expected for the untreated pulp. On the contrary, no sample bleached with hypochlorite has a maximum bursting strength equal to the average for the untreated pulp. All but one lie below the lowest value to be expected if the pulp remained undamaged.

The data concerning the properties of the pulps bleached to a brightness of 86 or higher are given in Table VI. A large proportion of those bleached with chlorite were treated too recently to permit the determination of the brightness after storage for one year. Of those which had stood for over a year, 1068-268 showed the lowest brightness, being 84.05. The general loss in brightness was 2 units, so that these samples which had originally been above 86 in brightness were now about 84. Conversely, of the samples bleached with hypochlorite, the brightest, 1068-252, now had a value of only 83.29. These samples had lost from 3 to 9 units of brightness, so that the resultant pulps were very inferior to those bleached with chlorite.

At this high brightness none of the samples bleached with hypochlorite had a tearing resistance the equal of that of the untreated pulp. While of the thirteen samples bleached with chlorite for which the tear at 70 seconds freeness could be calculated, there were three above the value of 47.5 which had been found for the untreated pulp.

None of the samples bleached with chlorite which had been selected for the comparison of average values (Table IV) had sufficiently high value for brightness to be included in Table VI. These highest values for brightness were obtained by bleaching with chlorite at higher consistence or higher temperature than the conditions selected for this previous comparison. The successful use of such drastic laboratory conditions indicates that chlorite in acid solution cannot damage cellulose. Because of this plant results should more nearly duplicate laboratory results than is possible when bleaching with hypochlorite.

TABLE VI.—HIGH BRIGHTNESS

	Brightness	Brightness One-Year Loss	Maximum Bursting Strength	Tear at 70 Seconds Freeness
		Chlorite		
1068-438	87.34	...	54.7	38.8
-284	86.87	2.36	50.5	50.0
-439	86.74	...	54.9	43.3
-384	86.73	2.05	55.2	45.9
-268	86.69	2.64	55.0	48.3
-445	86.69	...	50.2	44.1
-437	86.56	...	54.8	44.3
-274	86.50	2.16	52.6	49.7
-279	86.43	1.85	53.9	46.6
-502	86.43	...	51.4	43.3
-500	86.36	...	52.8	45.0
-257	86.28	2.07	50.6	(44)
-496	86.24	...	52.4	45.4
-262	86.20	1.70	52.4	46.8
		Hypochlorite		
1068-250	87.12	9.01	43.1	37.8
-251	86.86	7.02	46.3	37.8
-252	86.40	3.11	45.4	37.4
-216	86.37	8.90	44.5	38.0
- 35	86.08	4.00	43.1	(40)
-215	86.07	5.75	50.5	42.0
-214	86.01	5.10	47.5	42.7

Numbers in parentheses indicate freeness of first portion was above 70.

TABLE VII.—COMPARISONS ON VARIOUS PULPS

	Hypochlorite			Chlorite		
	Brightness	Maximum Brusting Strength	Tear at Max. Burst	Brightness	Maximum Bursting Strength	Tear at Max. Burst
Imported Sulphate	67.2	51.5	50	71.8	51.8	50
	72.3	44.0	47	74.2	46.5	46
Northern Sulphate	81.8	48.6	42.8	81.9	51.8	46.1
	80.5	47.2	43.8	80.3	55.7	53.0
Northern Sulphate	82.1	60.6	43.5	85.0	60.5	49.0
Southern Sulphate	84.7	40.1	39.6	86.1	43.7	45.0
	84.5	40.0	44.7	84.6	44.0	46.0
Sulphate	77.6	52.3	54.0	80.5	54.6	58.2
Sulphite	83.3	63.8	33.1	86.0	67.2	38.0
Sulphite	80.7	48.2	37	81.4	49.7	39.0

Comparisons on Other Pulps

The discusison so far has been confined to results upon a completely bleached southern sulphate pulp which had been obtained through commercial channels. Presumably this pulp had been as thoroughly bleached with hypochlorite as possible without severe damage. But it has been shown that additional chlorite could be used with advantage. In Table VII there are presented a comparison of the results of the use of chlorite and hypochlorite upon pulps with various histories. Some of these pulps were obtained in the raw state while others were partially bleached when received. In all cases the pulps were treated as one unit up to the indicated stage and then divided, one portion being treated with hypochlorite and another portion being treated with chlorite. These pairs of experiments are shown in horizontal lines. In most cases a different pretreatment is represented by each of these horizontal lines. These data show the superiority in brightness and strength of bleaching with chlorite compared to bleaching with hypochlorite. Not only is this superiority exhibited in the case of sulphate pulp bleaching, but it extends also to the bleaching of sulphite pulp. Textile chemists are finding that this same superiority extends to cotton and rayon. The results do not depend upon the exact nature of the impurities and colored bodies present but do depend upon the disinclination of chlorite to react with cellulose.

Chemical Properties

Wood pulp is also used as a source of cellulose for chemical reactions. Various properties are emphasized for the different uses. These chemical properties are generally supposed to be a more sensitive indication of degradation of cellulose than can be obtained through the determination of the physical properties used for evaluating paper making qualities. Early experiments showed that the use of chlorite did not lower and sometimes even increased the cuprammonium viscosity of the resulting cellulose. The differences were great and very clear-cut when compared to the results obtained by bleaching with hypochlorite. Table VIII shows a pair of results using sulphite pulp which indicates the magnitude of these differences. The low viscosity resulting from bleaching with hypochlorite was common experience so that a great number of experiments were not necessary to establish this result. The high

viscosity resulting from chlorite bleaching was established by numerous experiments.

Several samples of the sulphate pulp (southern) previously described were treated on sufficient scale to permit chemical analysis as well as the physical tests. The chemical properties are given under the designation southern sulphate in Table VIII. The brightnesses of these samples for each percentage of available chlorine are about the same. Chlorite bleaching has very slightly increased the alpha-cellulose content compared to that resulting from the use of hypochlorite. The resistance to 7.14% sodium hydroxide is about the same in all samples. Chlorite has significantly reduced the copper number of this pulp which originally had a value of 1.08. Hypochlorite has left this number essentially unchanged. The ash has been unchanged by treatment with chlorite and increased by treatment with hypochlorite. The greatest differences are to be found in the last column showing the viscosity in cuprammonium solution. Values for the chlorite-bleached samples, are very much higher than those for the hypochlorite-bleached samples. Before treatment this pulp had a viscosity of 16.0. Chlorite increased the viscosity of the pulp and lowered the copper number.

The remaining portions of Table VIII are concerned with pulps which had been specially cooked to produce a high content of alpha-cellulose rather than being cooked for papermaking. Only a portion of the analytical determinations were made upon these pulps. The results show the same high values for viscosity following chlorite bleaching which have been previously noted in the case of the other pulps. Bleaching with chlorite has also slightly increased the content of alpha-cellulose above that obtained by bleaching with hypochlorite.

Variations

The effects described have been produced by chlorite in acid solution. These conditions have produced the very best results when bleaching wood pulp with chlorite. It can also be used under alkaline conditions and at low temperature if hypochlorite or chlorine is used to activate the chlorite. The properties

TABLE VIII.—CHEMICAL PROPERTIES

Hypochlorite						Chlorite					
Brightness	Alpha-cellulose, %	Hot Alkali Resistant	Cu. No.	Ash, %	Viscosity	Brightness	Alpha-cellulose, %	Hot Alkali Resistant	Cu. No.	Ash, %	Viscosity
Sulphite											
...	84.7	77.6	2.18	..	18.3	...	87.7	79.1	1.65	..	70
Southern Sulphate											
(1.0% available chlorine)											
85.6	86.0	80.7	1.11	.52	13.4	84.8	86.8	80.9	.82	.24	17.7
(0.5% available chlorine)											
84.1	86.5	81.4	1.03	.49	14.3	84.5	86.7	80.9	.78	.29	17.7
Experimental Sulphate											
(Variation in next to last stage. Final stage chlorite)											
85.9	95.0	...	...	.13	12.0	85.3	95.6	...	...	.12	15.1
85.8	95.1	...	...	.18	11.3	83.6	95.7	...	...	.11	15.2
(Caustic between above stages)											
85.6	95.4	...	...	.11	14.6	86.1	95.8	...	...	.12	17.1
Special Northern Sulphate											
(Variation in next to last bleaching stage. Caustic. Then final stage chlorite)											
90.5	91.8	...	...	..	...	89.8	92.7	...	...	..	...
90.1	91.0	...	...	..	...	89.4	92.0	...	...	..	...
89.8	90.7	...	...	..	...	90.8	91.8	...	...	..	...

of the pulps resulting from the use of these mixtures are varied depending upon the conditions of bleaching. The individual properties are differently affected by changes in the bleaching conditions, so that the bleached pulps may approach those produced by the use of chlorite and acid, or may have lessened superiority over those which can be produced by the use of hypochlorite alone. The details concerning the relationships between the conditions of bleaching and the resulting qualities of the pulp will be reserved for future papers.

Conclusion

The data presented show that the use of chlorite and acid in bleaching wood pulp can be made to yield a high brightness without lowering the maximum bursting strength, and probably without lowering the tearing resistance of the pulp. Even at extremely high values for initial brightness these pulps suffer only a very slight loss of brightness when stored for over a year. A brief consideration of the chemical properties of the pulp has shown that chlorite and acid do not lower those properties which are supposed to be connected with the structure and size of the cellulose units. The use of chlorite, therefore, produces pulps which are superior in all these properties to pulps bleached with hypochlorite.

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Holds Large Stand of Pulpwood

Interest of 30 per cent in stock and debentures of Transcontinental Timber Ltd. is disclosed among assets of Transcontinental Resources, Ltd., recently formed by the Hogarth-Carr-Errington group to hold substantial interests in gold, iron, pulpwood, potash and oil properties. The Transcontinental Timber Company owns outright 851 square miles of freehold pulpwood limits located in eight townships on either side of the Algoma Central Railway near Hearst, Ont.

Originally, this land was a grant to the Algoma Eastern Railway and it now constitutes the largest freehold stand of virgin black spruce pulpwood in Ontario remaining outside control of the large pulp and paper companies. The limits are estimated to contain several million cords of high grade pulpwood and negotiations are now under way leading to cutting operations over a period of several years.

Transcontinental Timber Co. has outstanding 100,000 shares of common stock and $100,000 of debentures of which Transcontinental Resources Ltd. owns 30,000 shares of stock and $30,000 of debentures. Transcontinental Resources Ltd. has been formed for the purpose of consolidating a well balanced group of holdings in companies producing several basic resources.

Officers and directors of Transcontinental Resources Ltd. are well-known in Canada and include: Major General D. M. Hogarth, president, A. W. Carr, vice-president, Joseph Errington, J. H. C. Waite, W. H. Englebright, C. D. H. MacAlpine, and G. G. Blackstock who is also secretary-treasurer.

Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Bleached Sulphite More Acute—Some Grades of Old Waste Lower.

Effective September 30, 1939, under Treasury Decision 49,970, all publications, exchanges and trade associations, were denied access to import manifests at the New York Customs House. The Paper Trade Journal and other interested parties have vigorously protested this ruling, and as soon as the order of the Treasury Department is modified or rescinded, full publication of all manifests will be resumed in these columns. In the interim, the Paper Trade Journal is making every possible effort to gather all available information from manifests, at various outside sources.

NEW YORK IMPORTS

WEEK ENDING SEPTEMBER 18, 1940

SUMMARY

Newsprint .....8,926 rolls

NEWSPRINT

H. G. Craig Co., Inc., ——, Donnacona, 382 rolls.
International Paper Co., ——, Gatineau, 278 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 376 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 374 rolls.
International Paper Co., ——, Dalhousie, 7,170 rolls.
H. G. Craig Co., Inc., ——, Donnacona, 346 rolls.

RAGS, BAGGINGS, ETC.

Castle & Overton, Inc., *Berganger*, Buenos Ayres, 120 bls. rags.
J. Levy & Son, *Oriente*, Havana, 34 bls. rags.
Atlas Waste Manfg. Co., *Oriente*, Havana, 32 bls. cotton sweepings.

CASEIN

A. Hurst & Co., Inc., *Mormacpenn*, Buenos Ayres, 334 bags, 20,040 kilos.

LOS ANGELES IMPORTS

WEEK ENDING SEPTEMBER 18, 1940

——, ——, Powell River, 2,439 pkgs. newsprint paper.
——, ——, Ocean Falls, 2,862 rolls newsprint paper.

New Literature

Oil-retaining "Compo" porous bronze bearings are described in Stock List No. 1, issued by the Bound Brook Oil-Less Bearing Company, Bound Brook, N. J. Many sizes of these bearings, now carried in stock, are listed, supplemented with information on loads, shaft clearances and installations.

Lubricants for ball bearings, are discussed in a booklet issued by New Departure, Division of General Motors Sales Corporation, Bristol, Conn. It covers the selection and application of oils and greases and provides a simple method of determining the proper grade and viscosity of lubricants for various temperatures and bearing speeds.

The Model C Nicholson high pressure weight operated trap, is described in Bulletin No. 740, issued by W. H. Nicholson & Company, Wilkes-Barre, Pa. It supplies information on the construction, operation and applications for high pressure plants. Valves and seats are stocked for twelve pressure ranges, from 0 to 1500 pounds.

Data on thermostatically controlled electrically heated laboratory equipment is given in Bulletin No. 316, issued by the Precision Scientific Company, 1750 North Springfield avenue, Chicago, Ill. Information on cabinets of several types for research, routine testing or processing, and other materials is included.

Fluorescent controls and ballasts is the subject of a folder issued by Department 8-N-48, of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. It describes a standard line, suggestions on mounting units, ballasts, correcting power factor of lamps and other useful information.

Magnetic disc brakes are described in Bulletin No. 604, issued by the Stearns Magnetic Manufacturing Company, Milwaukee, Wis. It gives specifications, formulas, typical installations and other information on magnetic brakes.

Steam drainage and boiler feeding is discussed in a bulletin issued by the W. M. Acker Organization, Inc., 3167 Fulton road, Cleveland, Ohio. It describes the company's new automatic system, an important function of which is the deaeration of water fed to boilers, thereby liberating oxygen and non-condensable gases which are deterimental to metal surfaces.

Water wheels are covered in a 124 page catalogue No. WW40, issued by the Rodney Hunt Machine Company, Orange, Mass. Comprehensive information on modernizing water wheels, typical installations and many pages of engineering data are included.

Automatic material handling equipment is discussed in a 40 page catalogue issued by the Automatic Transportation Company, Division of the Yale & Towne Manufacturing Company, 101 West 87th street, Chicago, Ill. It covers over a hundred types and capacities of equipment, including fork and ram trucks, low and high lift trucks, cranes, paper roll and bale handlers and many special models.

Hanger bearings for screw conveyors are listed in Bulletin No. 640, issued by the Stephens-Adamson Manufacturing Company, Aurora, Ill. It describes and lists prices of the company's new "Sealmaster" hanger bearings, permanently sealed, self-aligning and designed for high operating efficiency.

Flexible couplings for direct connected machines, are covered in a 20 page data handbook, issued by the Adjax Flexible Coupling Company, Westfield, N. Y. It is of particular interest for engineers and purchasing executives. Specifications and a complete line of forged steel and cast iron couplings, with data on power and torque ratings, are included.

Great Eastern Leases Building

The Great Eastern Packing and Paper Stock Company has leased a two-story concrete building occupied by the Great Atlantic and Pacific Company, at 53-01 Grand avenue, Maspeth. It has 40,000 square feet and was built about ten years ago for the A. & P. Co., which has since found the space inadequate and is erecting its own building.

Metropolitan Paper Box Men Meet

BOSTON, Mass., September 16, 1940—By a "Conscription Act as passed by the Metropolitan Paper Box Manufacturers Association," and so worded in the announcement, some 65 attended the annual outing of the organization, held Wednesday, September 11, at the Vesper Country Club, Tyngsboro, Mass., where "a good time was had by all."

A feature of the day was the winning of the Haverhill Box Boards Golf Trophy, or Robert Gair Company Trophy a silver cup, by Gus Wiswall, with a net score of 66, who also had the lowest net score in two preceding years. The cup was won one year by C. L. Sheldon. The man winning the cup three times is entitled to its permanent possession.

The golf tournament began at 8:30 A.M., continuing all day and other outdoor games was scheduled to begin at 10 A.M., continuing the rest of the day. Luncheon and dinner were served at the club house.

At the close of the dinner, President C. Howard Wilkins called the gathering to order, noting the presence of Howard Scoles, president of the New England Paper Box Manufacturers Association; Harry Roden, publicity director of the National Paper Box Manufacturers Association, and Bill (William R.) Kreeger, secretary of the National Paper Box Manufacturers Association. Mr. Wilkins expressed appreciation to the supply men for many of the prizes donated by them.

Prize winners at golf were as follows: Best net score of box manufacturers, Gus Wiswall, 66, who won in addition to the trophy, an electric razor; best net supply men's division, Victor Boch, 72, sport jacket; second best net, C. Howard Wilkins, 68, zipper travelling bag; best gross, John Murray, 77, sport jacket; second best gross, Jack Megley, 79, combination grill and waffle iron; kickers handicap, Al Forest, 74, soda siphon; best selected nine in eighteen, Henry Lundgren, 36, combination grill and waffle iron.

In the other games the prize winners were: Quoits, first, Fred Schneider and Leonard French; second, H. E. A. Linton and J. Kelley, each one receiving a brush set; clothes pins (dropped in milk bottles), first, J. Kelley, silex for coffee; second, Louis Cohen, table cigarette lighter; nail driving, first, Gus Woernley, soda king; second, Lester D. Friend, table cigarette lighter; tug of war, box makers defeated the supply men, but both winners and losers received prizes, glass garters; bowling on the green, first, Paul Tetslaff, salad bowl; second, Stanley Haigh, polaroid desk lamp; baseball, in which the box makers won over the supply men by a score of 10 to 6, and in this case also, both victors and the defeated received prizes as well as the umpire, a table cigarette lighter in each case; putting 18 holes, handicap of 4 for golfers, first, Paul Tetslaff; second, Ben Nigrosh, combination clock and telephone list as prizes.

Winners of the attendance prizes, the numbers of which were drawn by Mr. Kreeger, were John Murray, $10, and Charles Morrison, $5. Other prize winners, with numbers drawn, were John Munro, first, three wooden golf clubs; second, G. R. Woernley, golf club; and C. E. Claff, sport jacket.

The committees was as follows: Publicity, Lester D. Friend; tickets, Frank Babcock; golf, A. C. Wiswall, chairman, and Stanley Haigh; games, Ben Nigrosh, chairman, and Leonard French; baseball, Fred Schneider, and tug-of-war, Otto Schultz. Among the box manufacturers present was Louis B. Ingals, Mayor of Marlboro, Mass.

Maine-New Hampshire TAPPI Plans

The group of members of the Technical Association of the Pulp and Paper Industry located in northern New England are formulating plans for its first meeting to be held at the University of Maine on October 25-26, 1940. Preliminary plans were made at a committee meeting held at Prouts Neck, Maine, in June. At that time the following organization committee was appointed:

W. E. Brawn, Pejepscot Paper Company, chairman, G. D. Bearce, Maine Seaboard Paper Company, E. P. Ingalls, S. D. Warren Company, Clifford Patch, Eastern Corporation, T. F. Spear, Oxford Paper Company, Gust. Johanson, Penobscot Chemical Fibre Company, N. L. Nourse, Brown Company, O. E. Anderson, International Paper Company, A. B. Andrews, P. deC. Bray, University of Maine, T. M. Barry, Fraser Companies, Inc., and G. A. Richter, Brown Company.

The University of Maine will be host to the first meeting. All former students interested in the pulp and paper and allied industries as well as all mill executives, chemists, engineers and superintendents are invited and urged to attend. Orono is located near Bangor, Maine, where accommodations may be found at the Bangor House and the Penobscot Exchange Hotel.

A numbed of interesting papers will be presented. H. G. Noyes of the Oxford Paper Company will discuss the very timely subject of Vocational Training; A. E. Norton, consulting chemist of Portland, Maine, will describe some new plastics; Prof. J. G. Caulfield of the University of Maine will outline some of the current research activities of the Pulp and Paper Department of the University. Richard Cross of the New England Council will talk on New England Industries. Other speakers will be announced later.

At the Friday evening banquet brief talks will be made by President Hauck and Dean Cloke of the University and entertainment will be furnished by the University Glee Club. There will be an inspection of the buildings and on Saturday afternoon a block of seats will be reserved at the Maine-Bates football game, one of the important Maine series games. Those desiring tickets should notify W. E. Brawn at the Pejepscot Paper Company as soon as possible.

Paper Supply Co. Buys Building

KANSAS CITY, Mo., September 16, 1940—Earl J. Tranin, who acquired the Paper Supply company the first of this year has just concluded the purchase of the building and the adjoining corner lot at Fifth and Delaware streets as the new home of his firm.

The acquisition gives him a 114-foot frontage on Delaware street. The building will provide more convenient quarters for his business and the adjoining lot will be used for parking of trucks and a loading dock.

The Paper Supply company is distributor of a varied line of paper products, including wrapping paper, bags and containers.

For over 70 years . .

Morris Pumps have given outstanding service in pulp and paper mills . . .

What users wrote in 1870

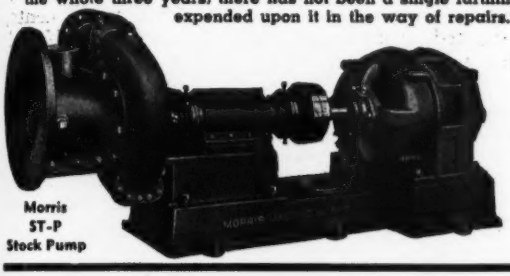
PROOF

What users write in 1940

"The pulp pump we bought of you in 1867 has run night and day from that time, and has not had a cent expended on it. Your pump runs with half the power of the old one we had; in fact it proves like all of your pumps we have in use, perfectly satisfactory."

"We have two of your pumps in use in our paper mill and they give us perfect satisfaction in every respect. We have had some experience in pumps, and consider yours the best in use."

"The paper mill we bought in 1867 has been running constantly, night and day (Sundays excepted), and in the whole three years, there has not been a single farthing expended upon it in the way of repairs."



Morris
ST-P
Stock Pump

"Your pumps show less wear than any type pump we have ever used. We consider our purchase fully justified, and will be glad to recommend MORRIS pumps to any one at any time."

"The most trouble-free pump on mixed paper stock that we have ever operated."

"Your pump has been in operation for a period of eleven months, operating twenty-four hours a day, and we have yet to install the first replacement part."

"Your pump is now pumping 6¼% to 6½% sulphate stock in our new beater installation. We are emptying the heater in just three minutes, one minute less than your estimate."

Write for Bulletin

Morris Machine Works - Baldwinsville, N. Y.

MORRIS

Centrifugal Pumps

"NON-USERS ARE THE LOSERS"

TENAX FELTS

FINISH AND TRIM

WHAT'S YOUR PROBLEM?

The makers of TENAX FELTS can proudly say that they help paper-makers to solve today's problems today. Because they cooperate in keeping abreast of current requirements, anticipate coming demands, and can promise for TENAX FELTS a *continuing* record of accomplishment. Have you a problem in your plant? If so, consult us at once.

"Non-Users Are The Losers"

LOCKPORT FELT COMPANY

NEWFANE, N. Y.—U. S. A.

New York Paper and Pulp Market Review

Paper and Pulp Markets Little Changed During Week—Contract Prices On Bleached Sulphite Unchanged For Final Quarter — Lower Prices On Lower Grades of Unbleached Sulphite Expected.

Office of the PAPER TRADE JOURNAL,
Wednesday, September 18, 1940.

Sales volume in the wholesale paper market is reported in some quarters of the trade as improved. The general market situation is little changed for this week, with the price situation firm. As the price level of pulp is relatively higher than paper, higher paper prices in the future are generally viewed in the industry as normally required to bring these markets into a better adjustment and balance.

The index of general business activity advanced to 105.8 per cent for the week ended September 7, from 105.3 per cent for the preceding week, compared with 97.2 per cent for the corresponding period last year.

Paper production of 230 mills for the holiday week ended September 7 was estimated at 71.3 per cent, compared with 85.4 per cent for 1939, with 77.5 per cent for 1938, with 80.7 per cent for 1937, and with 81.0 per cent for the corresponding week for 1936.

Paper board production for the week ended September 7 was 60.0 per cent, compared with 73.0 per cent for 1939, with 67.0 per cent for 1938, with 73.0 per cent for 1937, and with 78.0 per cent for the corresponding week for 1936.

Moderate activity in the wholesale paper market, with sales in a few lines running at about 5 per cent higher than at this date last year, is indicated in the reports received from many manufacturers' representatives, jobbers, and general paper merchants during the current week. Prices of all grades of paper are firm, with the trend likely to turn sharply upward later on as demand, under the stimulation of increased general business activity, which is expected to rise around the first of October. Somewhat higher prices on many grades of paper is generally looked for in the paper market.

Mechanical Pulp

No important change in the market situation of mechanical pulp has been reported during the current week. Production for the final quarter of the year is expected to about equal output for the first quarter. Production for July totaled 86,401 tons, 90,717 tons were used in paper production and stocks on hand at the end of July amounted to 41,683 tons.

Chemical Pulp

No change in demand or prices has been reported in any standard grade of chemical pulp this week. The contract prices announced on bleached sulphite continue the prevailing price. Prices on the lower grades of unbleached sulphite pulp which may be announced next week are expected to be lower.

Rags

Trading in paper making rags is reported limited to immediate requirements. Demand continues good for the higher grades of white and unbleached rags, in which supplies are rather limited. No important change in the prevailing quotations on any grade of rags has been reported this week.

Old Rope and Bagging

The old rope market is reported less active this week. Prices hold steady at prevailing market quotations.

Old bagging is firm, chiefly under the influence of rather limited supplies, but mill buying continues light and volume of trading is well under expectations in the trade.

Old Waste Paper

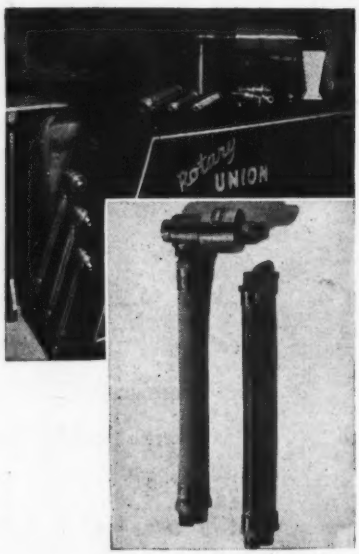
Broader mill buying has stimulated activity in some of the lower grades of old waste paper and has advanced news and mixed paper. Strictly folded news is up and currently quoted at from .50 to .55 cents, corrugated at from .65 to 67½ cents, and No. 1 mixed paper at from .32½ to .35.

Twine

No important change in demand or prices has been reported in any grade of hard or soft fiber twine during the current week. Prices on all imported fibers continue to reflect a firm tone, due to the difficulties in transportation.

Improved Rotary Union

According to the manufacturer, this improved rotary union is especially designed for web-driven rollers and wherever a gas or liquid line must be connected to a revolving shaft, roll or drum. Its low friction makes mechanical drives unnecessary, it is stated, and in addition, this union provides leakproof, maintenance-free service and longer life for greater economy.



Recent improvements, it is pointed out, provide for two types of unions—the standard union for use on water and steam up to 50 pounds pressure; and the heavy duty union for use on pressures over 50 pounds. The manufacturer further states that Rotary Unions are available for special requirements for brine and other types of liquids. Full details can be secured by writing to Perfecting Service Corporation, 2622 South Parkway, Chicago, Ill.

National

DYES FOR COLORED NEWSPRINT

PINK AND PEACH

National Safranine AP Conc.,
Chrysoidine YP Conc. New,
Chrysoidine RP Extra

GREEN

National Victoria Green
WBP Crystals

•

NATIONAL ANILINE & CHEMICAL CO., INC.

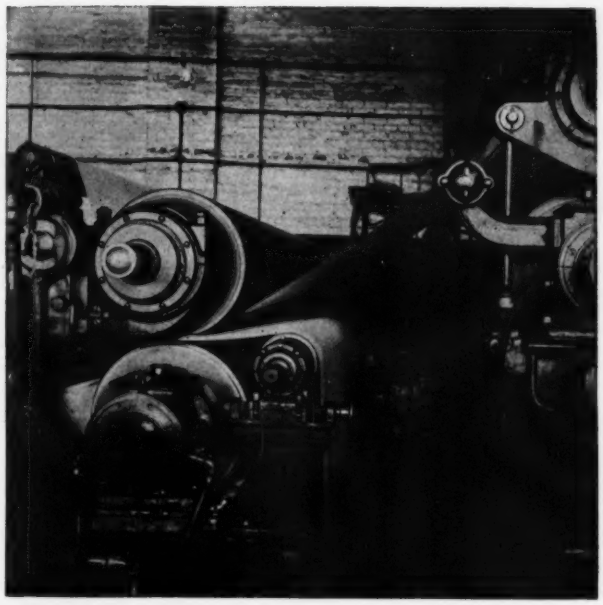
40 RECTOR STREET, NEW YORK, N. Y.

BOSTON	SAN FRANCISCO	NEW ORLEANS
PROVIDENCE	CHARLOTTE	CHATTANOOGA
CHICAGO	GREENSBORO	PORTLAND, ORE.
PHILADELPHIA	ATLANTA	TORONTO

BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

NATIONAL N DYES

Paper Dyes



MANHATTAN
Rubber Covered Rolls
—better rolls make better paper

The kind of paper that comes off your machines depends a whole lot on the rubber rolls you are using.

MANHATTAN Rolls are true, uniform, and are ground to precision finish —each one is engineered to its special requirements—from the compounding and curing of the rubber covering to the finished roll.

That's why MANHATTAN Rolls deliver continuous high, uniform production at low cost.

Have your next rolls re-covered by MANHATTAN.

Three convenient factories:

Passaic, N. J. Neenah, Wis. North Charleston, S. C.

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.

58 Townsend St., Passaic, New Jersey

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, September 18, 1940.

BLANC FIXE—Prices on blanc fixe are firm and unchanged and conform to prevailing market levels. The pulp is currently quoted at $35 per ton, in barrels, at works; the powder is currently quoted at $50 per ton, f.o.b., works. Demand reported moderate for the week.

BLEACHING POWDER—Quotations on bleaching powder are firm. Demand reported continuing fairly steady for the week. Bleaching powder is currently quoted at $2 per 100 pounds, in drums, at works.

CASEIN—Prices on casein are firm, with some grades a little lower for the week. Standard domestic casein, 20-30 mesh, is currently quoted at from 11 to 13 cents per pound; 80-100 mesh, at from 11½ to 14 cents per pound. All prices in bags, car lots. Argentina casein, 20-30 mesh, is currently offered at from 11½ to 12½ cents per pound. Quotations on French casein are nominal.

CAUSTIC SODA—Quotations on caustic soda are firm and continue unchanged at prevailing market prices. Demand reported moderate. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Prices on china clay are firm and conform to prevailing market levels. Demand reported moderate at this date. Domestic filler clay is currently quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is currently offered at from $13 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine are firm and unchanged. Demand reported good and market strong. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for the week with prices a little lower. "G" gum rosin is currently quoted at $1.60 per 100 pounds, in barrels, Savannah "FF" wood rosin is currently quoted at $1.60 per 100 pounds, in barrels, New York.

SALT CAKE—Prices on salt cake are firm and nominal. Shipments good. Domestic salt cake is currently quoted at $17 per ton, in bulk; chrome cake at $16 per ton. All prices in car lots, f.o.b., shipping point. The quotation of $20 per ton on imported salt cake is nominal.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market levels. Demand reported good for the week. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are firm and continue unchanged at prevailing market levels. Pearl is currently quoted at $2.90 per 100 pounds; powdered starch at $3 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand continues satisfactory for the current week. The commercial grades are currently quoted at $1.15; iron free at $1.60 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and conform to prevailing market levels. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mines. Quotations on imported talc are nominal.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$5.25	@	$5.75
Superstandard	4.87½	"	5.25
Northern Standard Wrapping	4.37½	"	4.62½
Standard Wrapping	4.25	"	—
Tissues—Per Ream—Carlots			
White No. 1	.97½	"	—
White No. 1 M. G.	.95	"	—
White No. 1½	.80	"	—
White No. 2	.75	"	—
Anti-Tarnish M. G.	.80	"	—
Colored	.85	"	—
Kraft	.87½	"	—
Manila	.77½	"	—
Unbl. Toilet, 1 M.	3.75	"	—
Bleached Toilet	5.26	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.10	"	—
Bleached, Jr.	3.60	"	—
Manila—per cwt.—C. l. l. s.			
No. 1 Jute	8.25	@	10.25
No. 1 Manila Wrapping, 35 lb.	5.25	"	—
No. 2 Manila Wrapping, 35 lb.	5.00	"	—
Boards, per ton—			
News	35.00	@	40.00
Chip	35.00	"	40.00
Sgl. Mla. Ll. Chip	55.00	"	57.00
White Pat. Coated	67.00	"	70.00
Kraft Liners	55.00	"	—
Binders Boards	73.00	"	80.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1.	$39.10@$46.00	$40.25@$47.25
100% Rag	31.05 " 36.50	32.20 " 37.75
85% Rag	.... "	29.90 " 35.00
75% Rag	23.60 " 27.75	24.75 " 29.00
65% Rag	.... "	21.65 " 26.25
50% Rag	17.55 " 21.50	18.70 " 22.75
25% Rag	14.65 " 17.75	15.80 " 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$9.35@$11.50	$11.55@$12.75
No. 2	8.50 " 10.25	9.65 " 11.75
No. 3	8.05 " 9.25	9.20 " 11.25
No. 4	7.70 " 9.50	8.90 " 10.75

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper.

Delivered in Zone 1

No. 1 Glossy Coated	$11.90	@$13.50
No. 2 Glossy Coated	10.35 "	11.75
No. 3 Glossy Coated	9.55 "	11.00
No. 4 Glossy Coated	9.15 "	10.50
No. 1 Antique (watermarked)	9.05 "	$10.50
No. 2 Offset	8.40 "	9.75
A Grade E. F.	8.20 "	9.50
A Grade S. & S. C.	8.45 "	9.75
B Grade E. F.	7.65 "	8.75
B Grade S. & S. C.	7.90 "	9.00
C Grade E. F.	7.35 "	8.50
C Grade S. & S. C.	7.60 "	8.75
D Grade E. F.	7.10 "	8.25
D Grade S. & S. C.	7.35 "	8.50

Tints @ India at $.30 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—		
Moist	Nominal	
Dry	Nominal	
(Delivered)		
No. 1 Domestic and Canadian	45.00	@46.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.72½	@	3.87½
Prime Qualities—			
Easy-Bleaching Sulphite	3.17½	"	3.75
Strong Unbleached Sulphite	2.85	"	3.75
(On Dock, Atlantic Ports)			
Kraft Bleached	4.12½	"	
Kraft Light & Strong	3.50	"	3.75
Kraft No. 1	3.40	"	3.60
(F. o. b. Pulp Mill)			
Kraft Domestic and Canadian	3.00	"	3.25
(Delivered)			
Soda Bleached	3.30	"	—

Add 60 cents per short ton, does charges for Albanay; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N Y

Shirt Cuttings—			
New White, No. 1.	6.75	@	7.00
Silesias No. 1	4.60	"	4.75
New Unbleached	6.50	"	6.75
Blue Overall	4.35	"	4.50
Fancy	3.25	"	3.50
Washables	2.00	"	2.10
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.15	"	3.30

Old Rags

White, No. 1—			
Repacked	3.25	"	3.50
Miscellaneous	2.75	"	3.00
White, No. 2—			
Repacked	2.50	"	2.75
Miscellaneous	2.00	"	2.25
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.75	"	1.90
Roofing Rags—			
No. 1	.95	"	1.00
No. 2	.80	"	.85
No. 3 (bagging)	.90	"	1.00
No. 4	.60	"	.65
No. 5A	.60	"	.65

Foreign Rags

All prices nominal

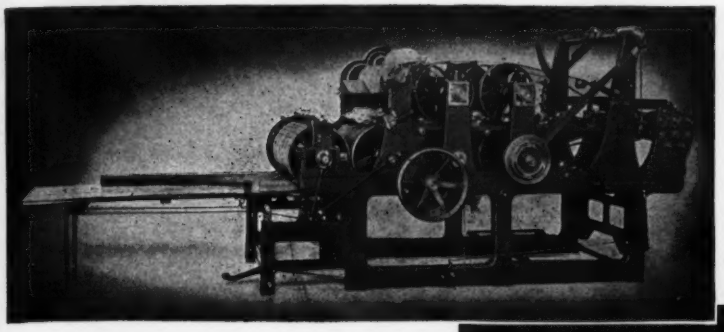
New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.25
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxford	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—

PAPER BAG MACHINERY . . .



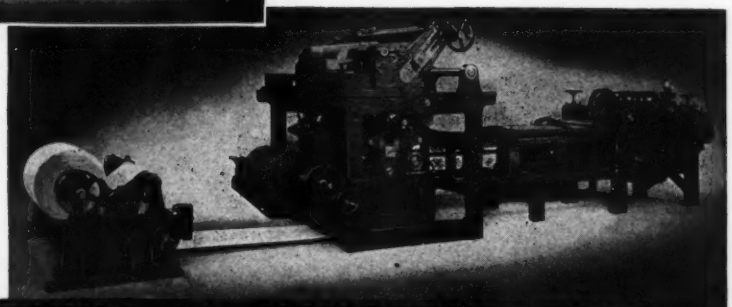
Machinery for flat, square, and satchel bottom bags. The famous tuber and bottomer for flour, cement, lime, and other heavy materials.

Heavy duty combination bottomer for valve or satchel bottoms.

←

Tuber for multiwall pasted bottom tubes with **Electric Eye** web control, keeping edge of paper in line for side seams and cross paster for bottoms.

→

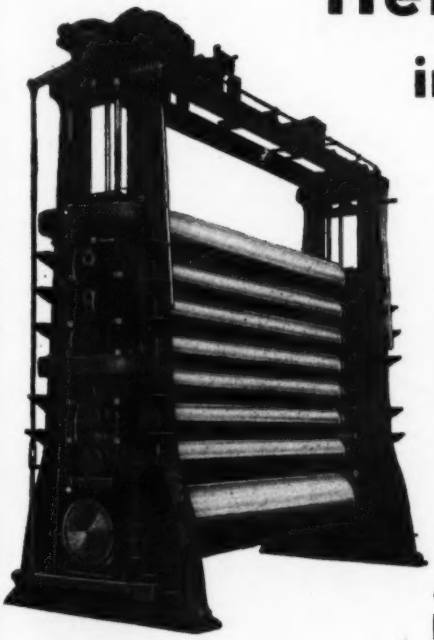


The SMITH & WINCHESTER *Manufacturing Company*

SOUTH WINDSOR CONNECTICUT 2

Good-bye Calendering Troubles—

Here's a GOOD BUY in CALENDER STACKS!



Judged the "best buy" by more than 300 modern paper mills who are users of LOBDELL CALENDER STACKS!

They're accurate, durable, easily operated machines. Rolls are of chilled iron or "Puraloy" and stacks may be equipped to operate with either electric motor, hydraulic or ratchet lift—all controlled from the floor. Modern, trouble-free lubrication keeps maintenance to a minimum.

Get details . . . they're freely yours. Just fill in and mail the coupon. No obligation.

---------- USE THIS COUPON ----------

LOBDELL CAR WHEEL CO., Wilmington, Del.

Without obligation, send me the data on LOBDELL CALENDER STACKS and your treatise on Chilled Iron Rolls.

NAME ..... **TITLE** .....

COMPANY .....

ADDRESS .....

P.T.J. 9-19-40

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	"	4.75
No. 2 White Cotton.	3.25	"	3.75
No. 3 White Cotton.	2.50	"	3.00
No. 4 White Cotton.	1.90	"	2.20
Extra Light Prints..	2.00	"	2.40
Ord. Light Prints...	1.75	"	2.15
Med. Light Prints...	1.55	"	1.95
Dutch Blue Cottons.	2.25	"	2.50
French Blue Linens..	3.00	"	—
Checks and Blues...	2.00	"	—
Linsey Garments....	1.90	"	2.00
Dark Cottons.....	1.50	"	1.60
Old Shopperies.....	1.30	"	1.45
New Shopperies.....	1.45	"	1.50
French Blues.....	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.75	@	3.00
Domestic	2.50	"	2.75
Wool Tares, light...	2.00	"	2.25
Wool Tares, heavy..	2.12½	"	2.25
Bright Bagging	2.25	"	2.50
Manila Rope—			
Foreign	4.75	"	5.00
Domestic	4.50	"	4.75
Jute Threads.....	2.62½	"	2.75
Sisal Strings.....	2.10	"	2.35
Mixed Strings.....	1.10	"	1.20

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1....	2.25	@	2.50
Soft White No. 1..	1.80	"	1.90
Soft White Extra..	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag.....	.90	"	1.00
Solid Flat Book...	.80	"	.85
Crumbled No. 1...	.70	"	.75
Ledger White Stock.	1.80	"	1.90
Ledger Stock Colored	1.30	"	1.40
Manila—			
New Env. Cut....	1.70	"	1.80
New Cuttings.....	1.30	"	1.40
Old Kraft Machine Compressed bales..	1.50	"	1.60
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue.	.70	"	.75
Strictly Folded....	.50	"	.55
Corrugated	.65	"	.67½
No. 1 Mixed Paper..	.32½	"	.35

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.19½	@	—
White Hemp.....	.19½	"	—
Fine Polished—			
Fine India.....	.23	"	—
Unpolished—			
Box	.17	"	—
Paper Makers.....	.15½	"	—
Tube Rope.....	.16¾	"	—
Wall Paper.....	.15½	"	—
Wrapping	.18	"	—
Soft Fiber Rope...	.16¾	"	—
Cotton	.16¾	"	—

(Hard Fiber)

Medium Java.....	.20	"	—
Mex. Sisal.....	.17	"	—
Manila	.24	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f.o.b. Phila.)

Shirt Cuttings—			
New White No. 1.	.06	@	.06¼
New White No. 2.	.03½	"	.04
Light Silesias.....	—	"	.04½
Silesias, No. 1....	—	"	.04
Black Silesias, soft	—	"	.03
New Unbleached...	.06	"	.06¼
Washable Prints...	.02¾	"	.02½
Washable, No. 1..	—	"	.01¾
Blue Overall.....	.04	"	.04½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales....	—	"	.03
New Black Soft...	.02½	"	.02¾
New Light Seconds	—	"	.04
New Dark Seconds	—	"	1.50
Khaki Cuttings—			
No. 1 O. D.....	.03½	"	.03¾
No. 2 Mixed.....	.01¾	"	.02
Corduroy	.01¾	"	.01½
New Canvas.....	.04½	"	.05
New Black Mixed.	—	"	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.50	"	2.75
Thirds and Blues—			
Miscellaneous	1.35	"	1.50
Repacked	1.55	"	1.65
Black Stockings (Export)	3.50	"	4.00
Roofing Stock—			
Foreign No. 1....Nominal			
Domestic No. 1...	—	"	.80
Domestic No. 2...	—	"	.80
Roofing Bagging..	—	"	.70

Bagging

(f.o.b. Phila.)

Gunny, No. 1—			
Foreign .....Nominal			
Domestic	2.25	@	2.50
Manila Rope.....	—	"	4.75
Sisal Rope.....	1.75	"	2.00
Mixed Rope.....	.75	"	1.00
Scrap—			
No. 1.....	2.25	"	2.50
No. 2.....	—	"	1.50
Wool Tares, heavy..	3.50	"	3.70
No 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	2.00	"	2.25

Old Papers

(f.o.b. Phila.)

Shavings—			
No. 1 Hard White	2.40	@	2.50
No. 2 Hard White	2.10	"	2.15
No. 1 Soft White	2.00	"	2.10
No. 2 Soft White	1.60	"	1.75
No. 1 Mixed.....	.90	"	1.00
Solid Ledger Stock..	1.90	"	2.00
Ledger Stock, white.	1.75	"	1.80
Ledger Stock, colored	1.25	"	1.30
No. 1 Books, heavy..	.80	"	.85
Manila Cuttings.....	1.75	"	1.80
Print Manila.....	.60	"	.65
Container Manila....	.50	"	.55
Kraft Paper.....	1.50	"	1.60
No. 1 Mixed Paper..	.40	"	.45
Straw Board Chip...	.40	"	.45
Binders Board Chip..	.40	"	.45
Corrugated Board...	.65	"	.70
Overissue News.....	.75	"	.80
Old Newspapers.....	.45	"	.50

BOSTON

Old Papers

(f.o.b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.00
No. 1 Soft White	2.00	"	2.25
No. 2 Mixed.....	.75	"	.80
Solid Ledger Books..	1.50	"	1.75
Overissue Ledger Stock	1.75	"	2.00
Mixed Ledgers.....	.85	"	.90
No. 1 Heavy Books	1.10	"	1.20
No. 1 Books, light..	.65	"	.75
Crumpled Stitchless Book Stock.....	.55	"	.65
Manila Env. Cuttings	1.85	"	2.00
Manila Envelope Cuttings, extra quality	2.35	"	2.60
White Blank News..	1.40	@	1.50
No. 1 Kraft.....	1.35	@	1.40
Extra No. 1 Kraft...	1.60	"	1.90
Mixed Papers.....	.35	"	.40
Print Manila.....	.50	"	.55
Container Manila...	.60	"	.70
Old Newspapers.....	.50	"	.55
Paper Wool Strings.	.95	"	1.10
Overissue News.....	1.00	"	1.10
Box Board Chips....	.40	"	.45
Corrugated Boxes...	.40	"	.45
Kraft Corrugated Boxes	1.05	"	1.15
New Kraft Corrugated Cuttings....	1.50	"	1.65
Screening Wrappers	.60	"	.70

Bagging

(f.o.b. Boston)

Gunny Bagging—			
Foreign	2.75	@	—
Domestic	2.25	"	2.35
Sisal Rope	2.00	"	2.25
Mixed Rope.....	.85	"	1.00
Transmission Rope—			
Foreign	—	"	2.40
Domestic	2.25	"	2.40
Soft Jute Rope.....	3.00	"	3.25
Manila Rope—			
Foreign	4.75	"	5.00
Domestic	4.75	"	5.00
Jute Carpet Threads.	1.50	"	1.75
Gunny Bagging—			
Foreign	2.75	"	2.85
Domestic	2.25	"	2.50
Bleachery Burlap....	4.00	"	3.25
Scrap Burlap—			
Foreign	2.45	"	2.50
Domestic	2.15	"	2.35
Scrap Sisal.....	2.25	"	2.50
Scrap Sisal for Shredding	2.30	"	2.65
Wool Tares, Heavy..	2.40	"	2.50
New Burlap Cuttings	3.75	"	4.00
Aust. Wool Pouches..	3.00	"	3.15
Heavy baling bagging	2.25	"	2.40
Paper Mill Bagging..	1.75	"	2.00
No. 2 Bagging.....	.75	"	.80

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints.	—	@	.03
Fancy Percales....	.04	"	.04¼
New White No. 1.	.07½	"	.07¾
New Light Flannelettes	.05	"	.05¼
Canton Flannel, Bleached	.07	"	—
Silesias No. 1	.05	"	—
New Black Silesias..	3.00	"	3.25
Red Cotton Cuttings	.04	"	.05
Soft Unbleached...	.07	"	.07½
Blue Cheviots.....	.05	"	.05½
Fancy	.02	"	.02½
Washable	.02	"	.02½
Cottons—According to Grades—			
Blue Overalls.....	.04¾	"	.05
New Black, Soft..	.03	"	.03¼
Khaki Cuttings.....	.03	"	—
O. D. Khaki.....	.03	"	.03½
Corduroy	.02¾	"	.03
New Canvas.....	.06¾	"	.07¼
B. V. D. Cuttings...	.07	"	.07½

Domestic Rags (Old)

(F. o.b. Boston)

White No. 1—			
Repacked	2.75	"	3.75
Miscellaneous	2.40	"	2.60
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.25
Twos and Blues.....	1.50	"	2.00
Old Blue Overalls ..	1.60	"	2.00
Thirds and Blues—			
Repacked	—	"	1.25
Miscellaneous	—	"	1.00
Black Stockings.....	3.50	"	4.00
Roofing Stock—			
No. 1.....	1.00	"	1.25
No. 2.....	—	"	1.10
No. 3.....	—	"	.90

Foreign Rags

(F. o. b. Boston)

Canvas	.04¼ @ —
Dark Cottons.....(nominal)	
Dutch Blues.....(nominal)	
New Checks and Blues(nominal)	
Old Fustians.....(nominal)	
Old Linsey Garments.(nominal)	
New Silesias.....(nominal)	

CHICAGO

Waste Paper

(f.o.b. Chicago)

Shavings—			
No. 1 White Envelope cuttings....	3.15	@	—
No. 1 Hard White	2.50	"	2.65
No. 1 Soft White.	2.00	"	2.20
Ledger and Writings	.85	"	.95
Solid Books.....	.95	"	1.10
Blanks	1.50	"	1.60
Kraft	1.40	"	1.50
New Kraft Cuts.....	1.60	"	1.75
Overissue News.....	1.00	"	1.10
Old Newspapers—			
No. 1 Folded News	.70	"	.80
No. 1 Mixed Paper	.40	"	.50
Roofing Stocks—			
No. 1.....	.95	@	1.00
No. 2.....	.85	"	.90

Newsprint Production Expands

Production newsprint in Canada during August 1940 amounted to 316,607 tons and shipments to 332,234 tons according to the Newsprint Service Bureau., Production in the United States was 86,633 tons and shipments 81,714 tons, making a total United States and Canadian newsprint production of 403,240 tons and shipments of 413,948 tons. During August, 31,724 tons of newsprint were made in Newfoundland, so that the total North American production for the month amounted to 434,964 tons. Total production in August 1939 was 347,595 tons.

The Canadian mills produced 485,614 tons more in the first eight months of 1940 than in the first eight months of 1939, which was an increase of twenty-six and nine tenths per cent. The output in the United States was 54,362 tons or eight and seven tenths per cent more than in the first eight months of 1939, in Newfoundland production was 37,248 tons or nineteen and one tenth per cent more, making a total increase of 577,224 tons, or twenty-two per cent more than in the first eight months of 1939.

Stocks of newsprint paper at the end of August were 160,123 tons at Canadian mills and 18,812 tons at United States mills, making a combined total of 178,935 tons compared with 189,643 tons on July 31, 1940, and 232,605 tons at the end of August 1939.

Tayloe Co. Buys Warehouse

The Tayloe Paper Company, 420-24 South Front street, Memphis, Tenn., has bought the warehouse across the street from its location. This building is 90 x 200 feet and includes three stories and basement.